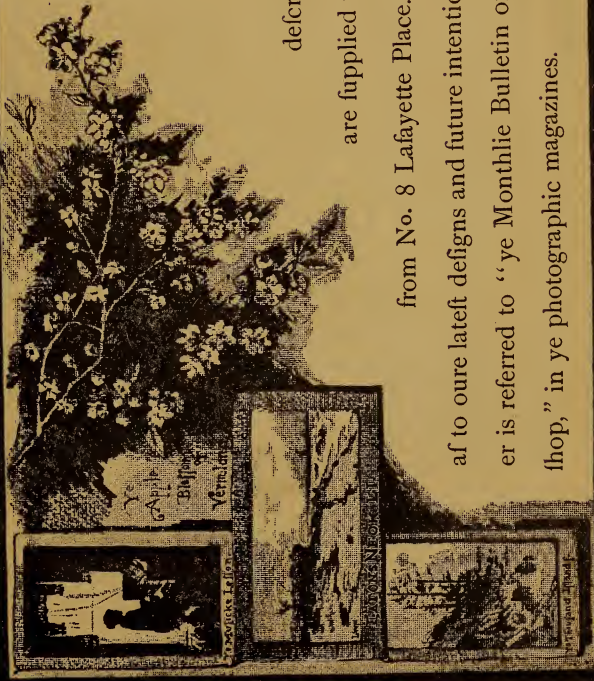


No. 8. Lafayette Place New York.



Many
of ye Studios
described in thys Booke
are supplied withe Backgrounds

from No. 8 Lafayette Place. For information
as to oure latest designs and future intentions the gentle reader
is referred to "ye Monthlie Bulletin of Seavey, hit worke-
shop," in ye photographic magazines.

LAFAYETTE
SEAVEY.
STUDIO.
Established
1865.

THE

STUDIOS

OF

EUROPE.

BY

H. BADEN PRITCHARD, F.C.S.,

*Late Honorary Secretary of the Photographic Society of Great Britain.
and Editor of the (London) Photographic News.*

AUTHORIZED AMERICAN EDITION.

NEW YORK :

E. & H. T. ANTHONY & CO., NO. 591 BROADWAY.

1882.

INTRODUCTION.

THE practical worker is very seldom a writer. He not only lacks time and opportunity to record his experiences, but generally underrates their value, and does not think them worth recording. This fact comes home very forcibly to those connected with photographic journalism, and to it is due the contents of this volume. Having found again and again the practice of photographers so different to the teachings of text-books and periodicals, we resolved upon a house-to-house visitation among the principal studios of Europe, determined to write down great things and small alike, as they came under our observation, and so produce a record of practice. At first, we feared that friends on whom we called might possibly resent our visit, and for this reason we made it a rule to intimate straightway that "if you have anything you desire to keep secret, do not mention it, and it will not get into print;" but we may say at once that the caution was never taken seriously, and we did not once fail to get a straightforward answer to any of our questions.

Our object in compiling this book has been two-fold: to produce a readable volume, and at the same time to afford practical information. It is not for an author to say how his book shall be read, but if we might offer a suggestion, it is that our "Studios" may be perused as they stand, first of all; and it is with this view that we have adopted a lighter and more colloquial style than that usually to be found in handbooks. The reader will thus obtain a general view of the contents, and when he desires afterwards to refer to the practice of different

men in different operations, the information is readily found by reference to this introductory chapter. As he will perceive, we have tabulated the information under nine headings, to wit, the RECEPTION ROOM, the STUDIO, the DARK ROOM, APPARATUS, PROCESSES, the NEGATIVE, MOUNTANTS, RESIDUES, and MISCELLANEOUS; and we have further placed the name of the photographer against the number of the page, so that our reader can refer to the practice of one authority or the other as he pleases.

Let us suppose the reader desires to learn something of colotype or Lichtdruck printing. Under the heading of PROCESSES, and *Printing, Collotype*, he will find the names of the authorities given, together with the pages where the information is to be found. Here are not only all the formulæ and the manipulations involved, but they are the formulæ and manipulations *actually made use of* by the chief authorities, and which have been found by experience to be the best. The whole practice, as we have personally viewed it in the studios of such men as Obernetter, Albert, and Löwy, is put before the reader as plainly and concisely as it is in our power to do. Or, take a more simple subject, that of mounting. In five minutes the reader may refer to the practice of half a dozen of the chief ateliers in Europe, and adopt either one or other of the modes of working as pleases him best.

We are well aware that our work is incomplete. The alternative was before us of postponing the publication of this volume until the series of representative studios was more perfect, or publishing forthwith such information as we had gathered together during the past two years. We decided upon the latter course, for the reason that our writings already fill one goodly volume, and that some little time may elapse before we have an opportunity of visiting Russia and Southern Italy, where several studios of note are to be found. In our next edition of the "Studios of Europe" we hope to include a description of these and several others; but as it is, we do not think our readers will complain of lack of enterprise. Where a studio of special interest was to be found, we have permitted no difficulties to stand in the way of seeing it. Whether the establishment was within the span of a London cab-drive, or beyond the reach of railways, we have visited it, if it were worth visiting, and the fact that a distance of something like fifteen hundred miles lies between Messrs. Valentine's studio at Dundee, and that of Herr

Koller in Pesth, is proof sufficient that our information was not obtained without some labour and fatigue.

We have pointed out that it was with a view to watch photographers at work that we undertook these practical essays; but we are in hope the professional photographer will be able to make use of our volume, beyond learning of the formulæ and manipulations of successful men. The arrangements of the reception-room—the rules and regulations in vogue with sitters—the prices charged for portraits—the sending out of proofs, and matters that concern the business of the photographer generally, have received particular attention, and we cannot but think that many will derive useful hints from the information thus brought together. As to the construction of the studio and dark-room, we have noted points from which many cannot fail to profit, and those engaged in building a new studio, or in re-arranging an old one, should derive benefit from our notes on the subject. The good work of the photographers we speak of in these pages will be known to our readers, and, no doubt, the latter will be able to perceive in our account, now and again, certain indications as to the manner in which this good work is obtained. All must, perforce, learn something; every one who reads of an improvement on his own mode of working will be gratified, no less than those who, cognisant already of what these pages tell them, will be confirmed in the proud knowledge that there is nothing other photographers can teach them.

Without further preface, we set down the contents of our volume.

THE RECEPTION ROOM.

Fitting and Regulations of Reception Room.—Elliott, 42; Hills, 50; Robinson, 126; Sarony, 148; Brown, 159; Lafosse, 161; Fergus, 184; Wane, 187; Liébert, 219; Benque, 211; Schaarwächter, 227; Prumm, 233; Adèle, 251.

Proofs, Supply of.—Hughes, 133; Slingsby, 143.

Prices of Portraits.—Downey, 20; Elliott, 43; Hills, 55; Blanchard 61; Van der Weyde, 76; Bassano, 80; Mayland, 105; Robinson, 126; Mayall, 131; Hughes, 137; Slingsby, 143; Sarony, 147; Brown, Barnes, and Bell, 156; Midwinter, 176; Fergus, 185; Wane, 191; Lejeune, 210; Benque, 211 and 212; Nadar, 216; Liébert, 220; Prumm, 234; Schaarwächter, 232; Adèle, 252; Koller, 265; Albert, 271.

Club Portraits.—Taylor, 37; Brown, Barnes, and Bell, 157; Lafosse, 162.

THE STUDIO.

Apparatus in the.—See APPARATUS.

Assistants, Pay of.—Nadar, 216.

Backgrounds, Screens, Furniture, and Accessories.—Bassano, 82; Elliott, 44; Hills, 54; Bassano's panoramic background, 82; Window, 93; Robinson, 125; Slingsby, 144; Mayall's ribbed, 131; Hughes, 136; Slingsby, 145; Sarony, 149. Out-doors, Lafosse, 162 and 163; Valentine, 193; Adam-Salomon, 205; Midwinter, 177; Russell, 181; Lejeune, 210; Nadar, 216; Schaarwächter, 229; Prümm, 235; Angerer, 260.

Construction and Lighting of.—Downey, 20; Blanchard, 61; Faulkner, 71; Bassano, 82; Van der Weyde, 71; Mayland, 103; Millbank Prison, 116; Pentonville Prison, 121; Robinson, 124; Mayall's Royal-Wedding Studio, 128; Mayall, 130; Hughes, 135; Slingsby, 144; Sarony, 148; Lafosse, 163; Valentine, 193; Annan, 201; Adam-Salomon, 205; Midwinter, 177; Russell, 180; Fergus, 186; Wane, 188; Benque, 212; Liébert, 220; Schaarwächter, 228; Luckhardt, 238, and Glazing, 240; Adèle, 250; Angerer, 259; Koller, 264.

Electric Studio.—Van der Weyde, 73; Swan's system, 169; Liébert, 219; Winter, 247.

Gas Studio.—Laws, 152.

Posing, Exposing, and Sitting.—Faulkner's drapery, 71; Faulkner's children, 69. Time allotted, Bassano, 82; Mayland's children, 102; Millbank Prison, 117; Pentonville Prison, 122; Lafosse, 163; Adam-Salomon, 204. Out-door groups, Lafosse, 162. Architectural photography, Barton, 172; Fergus, 185; Wane, 187; Lejeune's drapery, 209; Luckhardt's drapery, 237, and Posing, 239.

THE DARK-ROOM AND LABORATORY.

The Dark-room.—Abney, 56; Window, 95; Valentine, 194; Annan, 202; Swan, 168; Barton, 174; Lejeune, 210.

APPARATUS.

Actinometer.—Warnerke's, 108.

Balloon Apparatus.—Woodbury, 46.

Bath, Silver.—Burton's horizontal, 32; Barton's, 173.

Camera Apparatus.—England's lens-shade, 15; Faulkner's children's camera, 70; England's stand, 16; Elliott's canopy, 44; Bassano's shade, 82; Hills' electric camera, 52; Blanchard's copying camera, 63; Hills' universal dark-slide, 53; Window's universal front, 95; Mayland's shade, 104; Warnerke's roller dark-slide, 106; Mayall's lenses, 131; Mayall's stand, 130.

Cupboard for Dry Plates.—England's, 18.

Hygrometer.—Woodbury, 50.

Lens-finder.—Barton's, 173.

Roller, Velvet, for photo-lithography, 66.

Screens.—Prümm, 235

Shutters, Instantaneous.—Bedford's, 13; Valentine, 197.

Tent.—Barton's, 175.

Washing Trays.—Midwinter's, 179.

PROCESS.

Backgrounds, How to Tint.—Robinson, 125.

Canvas, Photography on.—Sarony, 149; Winter, 246.

Cartes Emaillées.—See *Enamelling*.

Cartes Russes.—Lejeune, 209.

Coating Plates with Gelatino-bromide.—Sarony, 151.

Collodion Making.—Taylor, 41.

Collodion Transfers.—Taylor, 37; Hughes, 134, 136.

Coloured Photographs.—Woodbury, 46; Koller, 265; Albert, 271.

Copying.—See *Enlarging and Reproducing*.

Enamelling Cards.—Liébert, 221; Adam-Salomon, 207.

Electric-light Photography.—Van der Weyde, 73; Swan, 169; Liébert, 219; Winter, 247.

Enlarging and Reproducing.—Blanchard, 63; Jennings, 26. Taylor's collodion transfers, 37; Window, 247; Brown, 161; Annan, 201; Benque, 213; Schaarwächter, 230; Winter, 247; Angerer, 261; Obernetter, 275.

Gaslight Photography.—Laws, 152.

Glass Plates, Cleaning.—Obernetter, 265; albumenizing, Schaarwächter, 230.

Lichtdruck.—See *Printing, Collotype*.

Mounting and Mountants.—See *MOUNTANTS*.

Opal Pictures.—Blanchard, 61; Sawyer, 34; Hills, 51.

Pigment Printing.—See *Printing, Carbon*.

Powder or Dusting-on Process.—Blanchard's for opals, 61; Obernetter's graphite, 275.

Printing, Carbon.—Autotype, 33, 35; Window, 96. Making Autotype tissues, 30. Transparencies at Autotype Company, 31; Jennings, 26. Faulkner's red chalk, 69. Opal, Sawyer's, 34; Hughes, 133, 136; Angerer, 261; Gêruzet's manipulations, 277.

Printing, Collotype.—Löwy, 254. Working manipulations and formulæ, Löwy, 255. Schnellpress, Albert, 268; Obernetter, 272. Sternpress, Obernetter, 273.

Printing, Photo-lithographic.—At Woolwich, 64. Preparation of sensitized paper, 66. Transfer ink, 68.

Printing, Phototype (printing press blocks), 110. Camera work, 111. Inking and transferring, 113. Etching, 113; Brown, 158.

Printing Platinotype.—At Platinotype Co., 76.

Printing, Silver.—Preparation of albumenized paper, England, 16. Sensitizing of albumenized paper, Bedford, 12; England, 16; Jennings, 25, 27; Taylor, 40; Valentine, 195.—Printing of albumenized paper, blisters prevented, Taylor, 41. Cracked negatives at Mayall's, 129; Sarony, 150. Ditto, vignetting, 151; Lafosse, 162; Valentine, 194; Wane, 191; Schaarwächter, 231; Prümm, 234; Albert, 270.—Toning of albumenized paper, Jennings, 28; Brown, 160.—Fixing of albumenized paper, Jennings, 25, 29.—Washing of albumenized paper, Bedford, 11; England, 17; Jennings, 25; Taylor, 41.—Slate troughs, Brown, 160; Valentine, 194; Wane, 189.—Printing skies, Bedford, 13.

Printing Type on Glass.—Warnerke, 109.

Printing, Woodburytype.—Woodbury's modified, 47; Woodbury's filigrain, 49, 157. Printing of gelatine matrix, 97. Pressing lead plates, 98. Printing, 100. Transparencies, 101.

Residues, Recovering.—See RESIDUES.

Retouching Negatives.—See NEGATIVES.

NEGATIVES.

Cracked Negatives, Printing.—Mayall, 129; Sarony, 150.

Gelatine Negatives, Development of.—Window, 94; Swan, 167; Benque, 212; ditto, test of sensitiveness, Swan, 167; test of composition, Swan, 166; ditto, choice of material, Warnerke, 109; Gelatino-chloride, Eder, 244.

Intensifying, wet process for photo-lithography, 64.

Retouching.—Bassano, 82; Mayland, 104; Lafosse, 164; Valentine, 194; Luckardt, 241; Adèle, 253.

Storage of.—England, 17; Downey, 22; Elliott, 45.

Varnish.—England, 17; Lafosse, 163; Luckardt, retouching, 241.

MOUNTANTS.

Mounting and Mounting Materials.—England, 18; Valentine, 197; Adam-Salomon, 207; Russell, 182; Barton, 174; Wane, 189; Benque, 213; Liébert, 218.

RESIDUES.

Recovering Residues.—Bedford, 12; Valentine, 196.

MISCELLANEOUS.

STUDIOS IN LONDON.

MR. FRANCIS BEDFORD AT CAMDEN ROAD.

TWENTY years ago, shortly after the death of the Prince Consort, his Royal Highness the Prince of Wales started on a journey to the Holy Land. The tour had been projected by Prince Albert, who traced it out with much care and forethought, the spots to be visited being such as he desired to impress particularly upon his son's mind as being likely to educate and interest the future King of England; and after her husband's death, her Majesty did not hesitate to carry out the project. The party selected to accompany the Prince was small, but well chosen. It included General Bruce, who was to be a sort of commander-in-chief of the party, Colonel Teesdale, Colonel Keppell, the Hon. Robert Meade, a college friend of the Prince, a physician in the person of Dr. Minter, and Dr. Stanley, the late Dean of Westminster. As this modern crusade was on the eve of starting, there came a hasty command from Osborne decreeing a further addition to the party; Mr. Francis Bedford was sent for by the Queen, and, after a few preliminaries, was introduced to the Prince of Wales as an extra travelling companion.

It is pleasant, even after this lapse of time, to listen to Mr. Bedford's reminiscences of this right Royal tour. They journeyed straight to the Mediterranean, where H.M.S. *Osborne*

was waiting to convey them into the Levant ; they boated on the Nile, wandered over Palestine to Jerusalem, and visited the relics of the Holy Land. The young Prince was affability itself, and the life and soul of the party. At Hebron, the Prince asked Mr. Bedford to remain behind to take certain photographs, and insisted on our friend being provided with a guard of fifty soldiers to keep him and his apparatus from harm. A series of 210 plates were secured by Mr. Bedford on his tour, and of these 175 were subsequently selected for publication, the Prince good-naturedly permitting Mr. Bedford to do pretty well as he pleased with them. But perhaps the best proof of the good terms on which prince and photographer travelled was afforded some years afterwards at Pall Mall, when the Prince of Wales, busy inspecting the pictures on the wall, suddenly turned round and said, "But where is Mr. Bedford? I don't see Mr. Bedford." That gentleman, however, was at the Prince's elbow, and the cordial manner in which Mr. Bedford was received at once showed that His Highness still remembered vividly the pleasures of the tour they made in company.

The bright landscape pictures of Mr. Francis Bedford, and of his not less talented son, Mr. William Bedford, require no commendation in these columns. In the same way as Mr. England appears to enjoy a sort of monopoly in Continental pictures, so the Messrs. Bedford stand pre-eminent in reproducing the soft landscapes and craggy headlands of our own country. Here is a trough a dozen feet long, in which many hundreds of pictures of English scenery are washing, the moving water bringing them into view one after another. The prints are small, none larger than whole plate size, and many of them for the stereoscope ; but they are all alike in this : they are sharp and vivid, but so soft and delicate, withal, that they look like exquisite engravings. "There is Exeter Cathedral," we say, "and that is the Valley of Rocks, and that is Lynmouth, with its big rocks and wave-beaten wall ; what a charming coast picture !" The last photograph is a favourite with Mr. Bedford, for it can never be taken again ; they have improved the place and carried away those big frowning rocks by the causeway, he tells us.

As a large publisher of pictures, Mr. Francis Bedford has paid great attention to the question of permanency in silver prints. He will have nothing to do with paper sensitized out of England,

and he is particularly careful to wash well. This is his plan : after toning and fixing, the prints are thrown into water, and an assistant, agitating them one by one by hand to free them as much as possible from the hyposulphite, passes them into a series of troughs. Into the first of this series of troughs falls a fast running stream of water, which overflows into the second trough, and from this into the third, and so on. The assistant washes his prints up the stream, which may be likened to that in the fable of "The Wolf and the Lamb," progressing from one trough to another until the prints arrive at the source. They are now taken out and put into the large washing trough, where they remain for something like eighteen hours. The trough has a false bottom of lattice-work, on which the prints rest—if they may be said to rest at all—and under this lattice-work is a serpentine tube through which, in winter time, passes hot water, so that the washing is kept at a tepid temperature. Like Mr. England, Mr. Bedford employs a little waterwheel, but he applies its motive power differently. When this water-wheel revolves, which it does about once a minute, from its buckets becoming filled, it naturally makes a revolution, and, so doing, turns a crank ; this crank causes a sort of flapper to work to and fro in the water, which is thus vigorously stirred, and agitates the prints. Moreover, there is a long arm or lever in the water, to the end of which is attached a float ; so long as there is plenty of water the float swims and the lever does not act ; but should the extreme end of the lever sink for lack of water, the other end rises and at once checks the water-wheel, when the supply of water flows into the trough uninterruptedly until the float (at the end of the lever) rises again.

Next in importance to his washing arrangements, the plan adopted by Mr. Bedford to collect residues calls for notice. Not less than 75 per cent. of the silver expended in printing is got back again at Mr. Bedford's establishment, a fact we would impress upon our readers with particular earnestness. Economy is frequently pushed to the extreme in studios in the matter of purchases, while the saving of residues is deemed a matter of secondary importance. From his hyposulphite solutions, Mr. Bedford estimates that he recovers half as much silver as from the first washing waters, a circumstance, we are sure, that will cause surprise to many photographers. The plan adopted to recover the silver from the washing of prints is exceedingly

simple, effective, and very easily explained. The three first wash-waters are supposed to contain all the silver salt that is worth collecting, and these are poured down a sink in one corner of the apartment; in the next room is a rubber tube connected with this sink, and here, too, are three big earthenware pans, each of them of sixty-gallon capacity, embedded in sawdust for protection against frost and injury. The rubber tube permits these pans to be filled one after another. When No. 1 is full, hydrochloric acid is added, and the liquid permitted to stand; No. 2 is next filled, and in its turn No. 3. By this time the chloride of silver in No. 1 has been precipitated; the clear liquid is drawn off, and the pan, which is pivoted at the bottom, may be relieved of its precipitate, or refilled with washings by means of the tube. The precipitate is filtered through flannel, dried, and then sent to the refiners; the converting of the mass again into nitrate is wisely left to the manufacturing chemist.

In the sensitizing room of Mr. Bedford's establishment—which, by the way, is exceedingly compact and complete—are facilities for exciting and drying 120 sheets of paper at a time. Four huge baths of nitrate of silver are ranged in a row on a low dresser, and by the time an assistant has floated a sheet on the fourth, the first is ready to lift up and put over the drying rod. A long trough upon wheels is placed under the wet sheets to receive the droppings of the precious liquid, the trough being moved along as every fresh row of sheets is added.

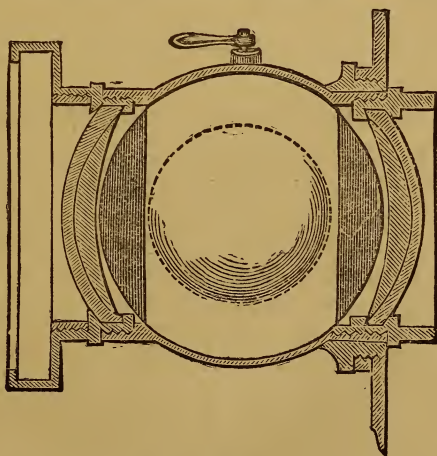
Most of the printing is conducted under glass, a linen screen being pulled across overhead if the sun begins to shine, for the sashes above are otherwise found to leave their mark on the delicate pictures. Every negative is edged with black paint, for the double purpose of giving the prints a white margin—especially agreeable in the case of unmounted prints, and Mr. Bedford issues all in this condition—and to economise the toning bath. The deep black edges in an ordinary print, Mr. Bedford avows, run away with as much gold as the picture itself. Finally, the painting of the margin facilitates the marking of the negative with its number.

The cracking of the negative film is rarely seen now, and this is attributed by our host to the circumstance that the collodion is better than it used to be. It is the latter, and not the varnish, that is at fault. Mr. Bedford has had negatives closely packed together, and almost unused, which on unpacking have shown

defects of this nature, while others freely stacked in boxes have exhibited nothing of the kind.

An ingenious method of improving the skies in negatives and softening the horizon line, and perhaps adding detail to a foreground, is adopted by Mr. Bedford. His former plan, as many of our readers know, was to cover certain portions of the negative with tracing-paper, and work with pencil, stump, or brush upon this. Tracing-paper, however, gets yellow and opaque in time, and in any case shows a very decided outline. But by grinding the reverse face of the negative—Mr. Bedford, like a careful photographer, always employs patent plate—by means of a glass muller and emery powder, a surface is secured upon which work of any description can be done. A few free strokes with a brush dipped in Indian ink, or with a pencil, add frequently to the value of a negative, while the mere grinding of the glass behind the horizon line, whether sea or ridge of hills, tends to soften this portion of the plate considerably. In a word, there are very few photographers who take such extreme care over their printing as the Messrs. Bedford.

Mr. William Bedford has recently devised an instantaneous lens mount, which he describes as a ball and socket exposing



valve. He says:—"I give a diagram, where, in order to make the arrangement more clear, the ball-and-socket are represented

in perspective inserted in a cross section of the lens. Although I have not yet practically worked out this design, the one I have made is very similar to it, and almost identical with the stopcock arrangement of Mr. Bolas, the only difference being that Mr. Bolas prefers to place his between the lens and the sensitive plate, whereas mine acts between the lenses of a double combination. In this latter position the ball-and-socket principle would possess the advantage of occupying less space, as the lenses can be brought nearer to a ball than to a cylinder of the same diameter, so that a larger working aperture of the lens is available.

In the diagram, the dotted circle marks the position of the apertures in the tin metal ball when the light is turned off. These apertures do not act as a stop, but allow the image to fall on the plate, in much the same manner as a shutter sliding near the plate does.

Of course there are optical as well as mechanical difficulties to be surmounted before any such principle would be practicable; but when we remember what was effected in the case of Johnson's Phantascopic camera, may we not hope to have a somewhat analogous principle successfully applied to such an important branch of the art as instantaneous photography?"



MR. WILLIAM ENGLAND AT NOTTING HILL.

WHEN Brown saunters down the *Rue de Rhone* in Geneva, with his hands thrust into the pockets of his tweed suit, proudly conscious that he has done the Swiss tour as it ought to be done, he begins to think about taking something home with him as a souvenir of his mountain trip. He has had his Alpenstock branded from top to bottom with the name of every peak and pass he has visited, so that it now represents a capital of some twenty francs; and has weighted his trunk with a mass of curious fossils and stones, which, somehow or other, appear less valuable now than when he picked them up on the mountain side; but he has, so far, purchased nothing to remind him of the snow-hooded peaks and crystalline glaciers he has seen on the "Continong." In these circumstances Brown is not long in making up his mind, and before many minutes have elapsed he is inside

one of the bright stationer's shops, and putting the question, "Avey-voos un photographe de la Mare de Glass?"

Brown, of course, means to ask for a photograph, and not a photographer, but, fortunately for him, the shopkeeper understands, and in a little while a magnificent series of Swiss views are at his disposal, from which he may pick and choose. How much clearer and more delicate are the photographs than those purchasable in England!—and they are so cheap, too. Brown makes quite a collection before he leaves the shop; they will astonish Mrs. Brown and the fellows at the club, and no mistake. It is months afterwards, when these same pictures are being examined in Brown's drawing-room, that a visitor with sharper eyes than usual, points out to the travelling Briton, in the corner of the yellow mount, and in very small type, the name of William England.

Yes, Mr. William England is probably the largest Continental publisher of European views, and here at St. James's Square, or rather in a compact little establishment at the back of his residence, is the source of all the prints issued in his name. In the summer, Mr. England travels in Switzerland, the Tyrol, and Italy for months together with camera and apparatus, bringing back with him additions to his series of photographs, the names of which fill a good-sized pamphlet. Mr. England confines himself for the most part to views of small size, or, in other words, rarely goes beyond a 10 by 8 plate. His favorite travelling camera is standing in a corner, and he sets it up for our inspection; it will do for stereoscopic pictures, or for whole-plate negatives. "Here is a simple arrangement for shading the lens," says Mr. England, and he shows us what appears to be the peak of a cap made of mahogany. The front flap measures four inches and the middle flap about three, and the double hinge arrangement permits you to bend down the peak right in front of the lens, if you like, so that you may almost employ it as a cap. But for shading the lens the arrangement is invaluable, and travelling photographers would be wise indeed to adopt so simple a modification to their apparatus. The harmony and delicacy of Mr. England's landscapes are proverbial; the sun's glare is never permitted to exercise a baneful influence upon the middle distance and horizon, and this simple shade has much to do with Mr. England's reputation as one of the first landscape photographers.

"And this is my travelling stand," says Mr. England; "I have knocked about with it all over the Continent for eleven years, and it is as sound now as on the day it was made." It certainly is a model tripod, with two very valuable properties: it has a broad base-board, whereon to screw the camera, and it is exceedingly light. Indeed, it is wondrous strange that the material of which it is made is not more generally employed for camera stands; its whole virtue is summed up in the word bamboo. For strength and lightness the stand is simply unrivalled, and when we say that the bamboo receives a good character from a man of experience like Mr. England, there can surely be no better recommendation.

Mr. England is a man of resource. At St. James's Square he prepares his own plates, and makes his own varnish, albumenizes his paper, prints and mounts his pictures, and does what lithographic or letter-press work the mounts require. Here is a model little printing establishment with two type-presses and a litho-press; and adjoining is the compositor's room, with type trays and desks complete. Both litho-press and printing-press are busily at work just now, and stacks of white and yellow mounts are standing by ready for printing. Farther on, across a spacious yard, half covered in with glass, where the printing takes place, is another building devoted downstairs to the toning and washing of prints, and upstairs to albumenizing paper and sensitizing it. The albumenizing is done when eggs are cheap, and there is very little mystery about the matter. The best Saxe paper is employed, and this is floated upon the albumen in the same way as paper is sensitized. White of egg to the extent of a few gallons is worked vigorously by a revolving whisk, and the salting solution added at the same time. The latter is in the proportion of:—

Chloride of barium	...	...	...	5 grains
Chloride of ammonium...	...	...	...	5 „
Albumen	...	...	...	1 ounce

the chloride being first dissolved in a little water. The albumen, after whisking, is permitted to stand for three days, and after being filtered through flannel is ready for use. Mr. England does not have recourse to hot plate pressing, or any other similar process.

The sensitizing takes place on a fifty-grain bath, a three-minute

glass, or egg-boiler, being methodically used to control the time. Mr. England prefers to dry his paper by artificial warmth, rather than spontaneously, and employs for the purpose a cupboard heated by a water bath; the water bath, while it causes the paper to dry quickly, does not permit it to become horny. The water bath supplies a damper heat than the outside air. The paper shows no creases, and exhibits no tendency to blister.

Mr. England's washing apparatus has already been described in the PHOTOGRAPHIC NEWS, but we may refer to it once more. In a big oblong trough is a big oblong tray; the bottom of the tray is composed of trellis-work made up of gutta-percha strips, and into this tray the prints are put. The trough contains water, and this naturally rises into the tray. The tray rests a few inches from the bottom of the trough, being pivoted in the middle at each end, so that it rocks on the slightest provocation. A little water-wheel at one side furnishes this provocation. A tap of water is running, and gradually fills up the buckets of the water-wheel, and whenever they are full, the water-wheel makes one revolution; in doing this, it lifts an arm attached to one side of the rocking tray, and the tray is thus lifted bodily on one side, causing the prints therein to be considerably agitated. Thus the prints lying in the water are vigorously shaken up every time the wheel goes round, and this may be made to revolve automatically once a minute or once an hour according as the tap of water runs fast or slow. The washing trough is, moreover, provided with a syphon arrangement for changing the washing water.

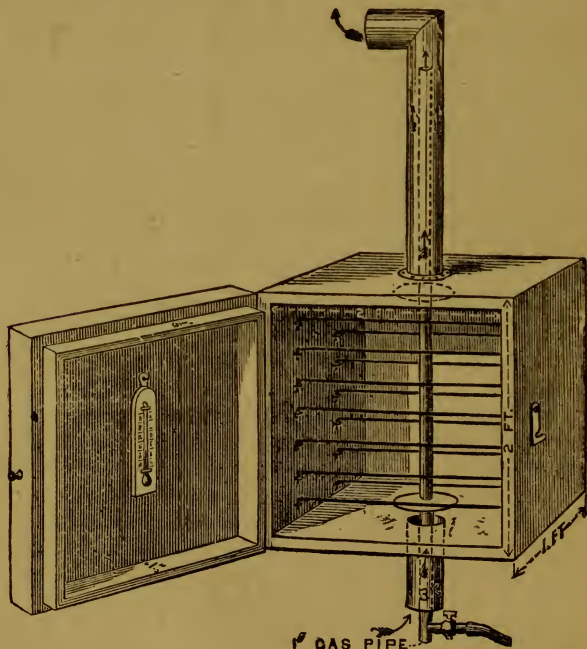
A very practical cutting-board, for cutting paper, is to be seen in the same building, which is no more than a block of beech; the grain of the wood being end on, it presents a most durable and perfect medium for cutting upon.

Mr. England stores some of his negatives—of which there are hundreds of thousands at St. James's Square—in ordinary rack boxes, and some braced together (with a sheet of blotting-paper between) by elastic web bands. If a negative is coated with proper varnish, there is no fear of the film rising, is Mr. England's opinion; and this is the way he makes his varnish. A pound of the best seed lac is put into a quart bottle of methylated spirit; the lac is shaken up from time to time, but the solution is not heated. After two or three days, the spirit will have taken as much lac as is necessary, and the clear liquid is poured

off. The residue may either be thrown away, or employed again with fresh lac.

For mounting, Mr. England employs only gum—the very best white gum—of which solutions are freshly prepared. Mounts have given him a great deal of trouble, and now he tests for antichlor or hyposulphite before he trusts to new cards; he has a liking for enamelled boards. His stock of prints, which is obviously very extensive, is kept, however, in an unmounted condition. A large staff of girls find employment in these mounting and finishing rooms.

As our readers are aware, Mr. England is *facile princeps* in the preparation and manipulation of gelatine plates, and his drying-box is the best model yet devised. It is nothing more nor less than



a light-tight cupboard, with wires stretched across to support the plates. Through the centre runs an inch gas-pipe, open at both ends, at the bottom of which is a small gas jet which burns inside.

At the top and bottom of the box are two draught-holes cut, to which a tin tubing of about three inches diameter is attached, as shown in the figure.

The gas tube gets warmed with a very small jet of gas burning in it, a mere pin-hole being sufficient exit for the gas. This warms the air in contact with the tin tube, and also slightly the air inside the cupboard. The consequence is, that a current of slightly warm air is set up, and circulates amongst the plates while supported on the wires, and the drying of the films takes place rapidly. Five or six hours is a sufficient time in which to dry the plates, whilst without the gas jet it would take twenty-four hours or more. In the inside of the cupboard, and near the top and bottom, are placed two cupboard discs to stop the possibility of any stray light entering, and as the whole affair is placed in the dark-room, the chances of any such access even without it would be small.

Inside the cupboard door is fixed a thermometer, and the jet is regulated so that a temperature of about 70° is indicated— 80° would do no harm to the plates; beyond that temperature it might not be safe to go.

The small gas jet used is the same as may be seen in tobacconists' shops; the hole in the end is plugged up, and a very small hole drilled at the side.



MESSRS. W. & D. DOWNEY AT EBURY STREET.

SOME people may suppose that the Messrs. Downey reserve to themselves the right of only photographing titled personages; this is a mistake. A circular published by them certainly conveys the idea that "anybody, as calls himself anybody," must perforce be portrayed by the famous Newcastle firm which has now established itself in the neighbourhood of Buckingham Palace; but Messrs. W. and D. Downey are really not averse to take any of Her Majesty's subjects any more than the Queen herself. Indeed, we may go further, and say that on comparison Messrs. Downey's charges will be found to be less in some respects than those of other fashionable portraitists. You may tender a guinea at Ebury Street without giving offence, but for this guinea you can only command one pose; for every

additional position an additional charge is made, so that perhaps in the end the fees are much the same as elsewhere. The new Promenade or Panel portrait naturally enough commands the highest prices, and for six of these £3 3s. are asked. Cartes are one guinea the dozen—but you have only one position—and cabinets are charged double; as a matter of course, the fees are paid before the pictures are taken. The Panel portrait is certainly making way, the one drawback being, so we are told, that it can only be used for standing portraits.

Messrs. W. and D. Downey occupy two modest little houses in Ebury Street. The showrooms, which are also exceedingly modest and simple in their nature, are on the ground-floor. The public pass straight into them from the street, and to get to the studios and dressing rooms there are but eight or ten steps to mount. The studios are, therefore, easily come-at-able. We have no need to speak of the excellence of the work of Messrs. Downey; their staple is evidently the Cabinet portrait just now, and these are executed, as our readers know, with high skill and artistic finish. At No. 61, Ebury Street, there are two studios, and at No. 57, one glass room, which is only just completed.

This new glass room is a very fine building. It faces, or rather its entire length does, due north. It measures 42 feet by 14 feet. One side is a blank wall with a single window; the other three sides and roof may be described as entirely of glass. But it is all ground glass, and the soft illumination thus secured is simply delightful. That portion of the roof which faces south has white boards screwed over it, which boards may be removed, one or all, at any time in winter or dull weather; but it may be taken for granted that they will be a fixture under general circumstances. Wood is said to be the coolest roof that can be secured; but there is, of course, ample ventilation provided. Backgrounds, properly speaking, will be eschewed, and the studio fitted up as much as possible to represent a light drawing-room. The plaster wall is painted a French grey, which almost resembles a lavender, and a panelling of ground glass runs right round the skirting. Curtains running across the apartment and movable screens permit of casting any shadows that may be desirable, but it will be Messrs. Downey's aim to photograph their models standing in front of a ground glass window at one end of the studio. The light coming

through this background window is, of course, very subdued, but it will give a wonderful effect of relief, and represent the model as standing beside the window of an ordinary drawing room. On either side of the window are movable door-like screens to aid in effect. At the other end of the studio the glass is not seen, by reason of a practicable screen or partition that has been erected; but a door in this partition may be opened to permit a model to stand, who will thus be lighted up as if in a doorway or in an opera-box, &c. As we have said, there is not one atom of clear glass about the studio.

It is just sixteen years ago, Mr. Daniel Downey told us, since his brother and himself were called to Balmoral for the first time by order of Her Majesty; and although no one will deny that the firm has enjoyed opportunities which others have not been so fortunate as to secure, it must be remembered that it is not everybody who knows how to make good use of an opportunity. At that time there was no accommodation to be had near the Castle and grounds, and the brothers were glad enough to shelter themselves and their apparatus in a labourer's cottage. But they did not want for personal comforts, for hardly had they arrived than the Prince of Wales, knowing of the strait the photographers were likely to be in, drove over in a waggonette to see them, and good-naturedly sent up provisions and wine at once for their especial behoof. The reception turned out to be one of good omen, and is likely to remain in the memories of Messrs. Downey many a long day.

Everybody has seen the portrait of the late Earl of Beaconsfield in a black velvet coat taken by Messrs. Downey. It was not an easy portrait to secure, and it was taken, it appears, some nine years ago at Balmoral, when the ex-Premier's name was not Beaconsfield, but Disraeli. The Messrs. Downey had just completed a spell of work at the Castle, and had made arrangements for a few days' tour in the Highlands before returning to Newcastle. Accidentally the Premier ran down to have audience of Her Majesty, and the brothers had to be recalled from their pleasuring on purpose to photograph Benjamin Disraeli. Back they came, and in the morning Mr. Disraeli walked into the improvised studio in a coat of azure blue and light trousers. They tried and tried again, but the photographs did not please. It had been difficult before to persuade the Premier to sit for his portrait, but he resisted all

importunities the next day. Lady Churchill did all she could, and only when the stubborn First Lord heard that it was Her Majesty's keen desire to secure a portrait, did he consent to sit once more. Unfortunately, it was a dull rainy morning, and the natty velvet jacket in which he was now arrayed was a source of constant anxiety to Her Majesty's Chief Minister; a few rain drops might spoil its gloss beyond redemption, and this care, together with the long exposures necessitated by the dull light, again prevented the photographs being successful. The fruits of the second day were no more satisfactory than those of the first. As to suggesting further sittings on the third morning, it was more than any who valued peace of mind dared do. There was the Premier still at Balmoral, walking about the grounds, but who was to ask him? At last, Lady Churchill plucked up courage, and spoke once more to the First Lord of the Treasury. He was obdurate at first, but in the end he consented to give five minutes, but only five minutes. He appeared again in the velvet jacket, and in a very bad humour; but the negatives secured on that occasion have become famous. Hundreds of thousands of prints have been circulated, and the negatives have been printed in silver, carbon, enamel, and both woodburytyped and collotyped. It was some time afterwards before the Messrs. Downey consoled themselves for the loss of that Highland holiday of theirs, but they seem now, at any rate, to have quite got over the disappointment.

Messrs. Downey's printing for the most part is done at Newcastle, where also all the pictures for publication are mounted and finished; but some work has, of course, to be completed in town. All negatives for private customers, which are not required to stand so much wear and tear, are retouched after they are varnished, but in the case of popular portraits the retouching is first done on the film, which is then varnished. For washing prints, white earthenware utensils are employed, for much stress is laid on cleanliness in Ebury Street, and this is obviously secured by having utensils that show the dirt very plainly. All negatives are stored, packed in brown paper, and not loose in racks.

We spoke on the subject of photographs of "Beauties" before quitting Messrs. Downey's famous establishment. The affair is by no means so simple as it seems. As a matter of course, no portrait is ever published without the full consent of the sitter,

and we feel sure that this assurance of Messrs. Downey's finds an echo in every studio of standing throughout the country. But here is the difficulty. A lady gives permission to have her portrait published; as it is a very good one, and shows her in a favourable light, she has no objection if it does meet the public eye. Nay, more; probably the more frequently her picture is seen, the better she likes it. The photographers have taken much pains upon the portrait, and they proceed at once to print the negative. They do not issue the prints at once, for fear these may be copied, but wait until they can stock the market. Then the firm issues to the trade. Dealers in all parts of the country buy, and the portrait circulates everywhere. At this juncture, maybe, the lady repents of her decision, and comes post haste to Messrs. Downey, asking that the picture may be withdrawn. This is impossible; the matter no longer rests with the original producers. They may say, "Very well, we will not print another copy;" but this has not the effect of withdrawing the print from sale. On the contrary, if dealers already in possession of prints get to know that a photograph is no longer printed, the price of it goes up at once, and very much is made of it; unscrupulous printers will set to work copying under the circumstances. In any case, the producers are not to blame. So far as Messrs. Downey are concerned, they have never published a portrait without the full consent of the model; but ladies, and especially those who are given to changing their minds, should remember that a permission once given is not, as we have shown, so easily cancelled.

MR. PAYNE JENNINGS AT WEST DULWICH.

APART from Mr. Payne Jennings' rare skill and refinement in the art of making pictures—qualities that few of us can ever aspire to—there is much in his work that may be studied with advantage by every photographer. He has shown in the true spirit of an artist how all-powerful is the pencil of light. He coquettes with pebbly brook and leafy dell, wooing nature under every humour. Now he follows the coy maid into green vale and over purple moorland, now under shadow of deep boulders,

beside the rushing foam, now among the yellow-green willows of a placid backwater he makes his capture. Sunshine or shade; the bright lakelet or gloomy cavern; the shadowy foliage of lofty tree, or tender undergrowth of fern and flowret; the black-lichened rock, or snow-flecked clematis—all are tenderly limned upon the sensitive plate, and the sweet pictures thus crystallized for ever.

Mr. Payne Jennings, then, is one of that small band—we might almost count the number on our fingers—who can gather pictures by the wayside with his camera. His pictures—and one can only say this of a very few workers—are published and purchased as pictures, and not as photographs of this spot or that. But as an art-photographer he has done more than this. “Delicacy and brilliancy I believe to be perfection in a photograph,” said our host; “and to secure these a light tone appears to me absolutely indispensable.” It is to this decided opinion that we owe the new school of printing, for we can hardly call it by any other name, with which Mr. Payne Jennings has made us familiar. Warm tints and delicate tones are no novelty, it is true; but when we have a photographer coming forward who dares to risk the printing of all his work in one particular tint and depth, we must acknowledge that he has courage to back his belief in spite of every prejudice, while the success that has attended Mr. Payne Jennings’ publications is ample proof of the correctness of his views.

At Dulwich there is but a printing establishment, and nothing more. Mr. Jennings rarely mounts his own pictures; all his efforts, when not very busy with the camera, are confined to printing; and since he has to supply during the present season some 90,000 impressions for Christmas cards, it may be taken for granted that this work is quite enough to occupy his attention. We all know that Christmas Annuals are written in the summer time, and that the stories of snow-bound travellers that are served up to us every year in coloured bindings in which the holly berry and robin redbreasts prevail, are usually thought out and elaborated in the dog days; but even with this foreknowledge it strikes one as strange to see photographic printers busy in the hot months upon work that is destined for midwinter sale. Yet here, at Dulwich, in the piping hot sunshine, they are printing away at photographs for Christmas at the rate of a thousand a day. Heaps of prints lie before us, all of that

delicate warm tone which Mr. Payne Jennings loves ; they are little vignettèd landscapes, carte size, in sheets of six, and, as we look on, an assistant is hard at work with a pad of felt on the table before her, and a short wooden knife in one hand, smoothing and flattening them, sheet by sheet. Deftly she seizes a curled and cockled print, and puts it, face downwards, on the pad ; then, passing the wooden knife edge over the back, working from the centre, she converts the sheet into smooth paper, and gives it a "set," so that the impressions may be piled without difficulty.

What are Mr. Payne Jennings' rules as regards printing ? it will be asked. In the first place, he employs a strong sensitizing bath—or, at any rate, not a weak one—never under fifty grains to the ounce ; he invariably sensitizes, prints, tones, and fixes in one and the same day, performing the operations as quickly one after the other as he can. He has recourse to acetate toning, and, as everybody knows, he does not carry the toning too far. He believes that the hyposulphite bath always requires to be neutralized with carbonate of ammonia, and he never employs anything but glazed earthenware in which to wash his prints, since it is not likely to harbour hyposulphite. During the first hour that the prints remain in the washing trough (into which fresh water is continually running), and after they have passed through several preliminary rinsings, they are continually being manipulated by hand, each sheet being turned over and separated, so that they may be perfectly washed.

The paper is very quickly sensitized and dried ; ten minutes will usually suffice for the operation. This is the sensitizing room, and very light and airy it is. The front is of glass, covered with one thickness of yellow tammy ; but an additional screen is provided to protect the sensitized paper, and to keep in the warm air, just by the fire. A sheet is floated, drawn as usual over a rod at the end of the bath, and then lifted against the edge, so that it draws with a sucking action, bringing up with it the minimum of solution. The sheet is then blotted against filtering paper, to still further remove the liquid, and is then so slightly damp that in five minutes all superfluous moisture has been driven off. The surface is now rubbed with a soft rag to remove any fibre from the filter-paper, and it is ready for the printing-frame. Many might call the paper still

moist, but, at any rate, it is not dry enough to cockle. The pressure-frames are set in the shade, and, as all Mr. Jennings' negatives are very thin, the printing goes on apace. Mr. Jennings' paper has a faint roseate hue.

With few exceptions, Mr. Payne Jennings prints from reproduced negatives. Indeed, he could only print so many pictures in this way. The original negative is treated as they do the original dies at the Royal Mint; the sovereigns that are coined in large numbers every day are all from the same original engraving; but it is from replicas of this, and not from Mr. Wyon's own handiwork, that the actual striking takes place. Mr. Payne Jennings follows this example. From the original negative a transparency is produced by means of carbon tissue, which, as our readers know, the Autotype Company prepare especially for such purposes. This transparency is usually dense enough without any intensifying; but when it comes to printing a negative from it (also in carbon tissue), reinforcing, to some extent, is necessary. This is done by means of permanganate of potash, the tissue, be it stated, being developed invariably upon thin patent plate coated with a film of gelatine. In this way Mr. Jennings has no difficulty in producing negatives—which are never dense—all of the same intensity, so that he can print half-a-dozen of them at a time in one frame.

Besides the small work, and his large, well-known studies, Mr. Payne Jennings is at this moment engaged in illustrating no less than eighteen different volumes of poems—"all, I am sorry to say, in silver," said Mr. Jennings. "I should much like to employ a mechanical process, or carbon, or platinotype, and I hope sincerely I may soon be able to do so; my only desire is to produce prints as delicately and brilliantly as I can, and, so far as I have seen, none of these processes can compete with silver. I shall be only too happy to adopt them when results as beautiful are to be secured by their means." Mr. Payne Jennings, as a producer of pictures, must please his master—the public; this is the main point he must keep steadfastly in view.

Mr. Payne Jennings, for his camera work, prefers either spring or autumn. Spring in half-leaf is the best time, he thinks; the graceful outline of the trees is seen to advantage, and the wind has less power than upon full foliage. Many photographs, he thinks, are marred by accidental lights; you want broad effects, and not lighting here, there, and everywhere. Again,

photographs against the light furnish finer contrasts than can be obtained in any other manner; masses of shadow thrown into relief are then secured, and the lighting is much bolder. Mr. Jennings does not think that extra-rapid plates, however useful they may be, will add to the number of our artists; the art-photographer rarely wants to work with an exposure of one five-hundredth of a second. He does not care much about depicting express trains going at lightning speed, or four-horse coaches at twelve miles an hour. He is concerned more in obtaining a bit of romance or poetry in his sketches—in depicting a deep-shadowed glen or a sedgy pool in which the yellow water-lilies grow. An old water-mill beside the flowing river, forsaken, and in ruins, that lies here on the table, seems certainly to bear out what our host says. It embodies the well-known German ballad of the “Mill-Wheel”—

“In einem kühlen Grunde
Da geht ein Mühlenrad,
Mein Liebchen ist verschwunden
Die dort gewohnt hat.”

“I, for one,” says Mr. Payne Jennings, “do not believe in any formula giving a weak sensitizing bath. The paper dealers, I know, frequently send out printed instructions, which you are asked implicitly to follow, and give you a silver bath as low as 30 grains to the ounce. I have, however, never been able to work this successfully, and generally find 50 grains to be the minimum strength compatible with good results. In the sensitizing dish it will be well to have a glass rod attached to one end, and each sheet of paper should be pulled over this after sensitizing; it may then be blotted off on stout blotting-paper, and hung up to dry. I think it is much better not to have the paper bone dry when placed in the frames, especially in summer-time. Before placing the paper on the negative it should be carefully wiped with a piece of clean linen or silk, as the fluff from the blotting-paper adheres slightly to the surface. There can be no doubt that shade-printing in all cases is the most economical (except, of course, in the very exceptional case of a hard negative), there being much less likelihood of your amassing a large quantity of defective prints. The general depth of your batch of prints must depend entirely upon the state in which you keep your sensitizing and toning bath. The intelligent printer knows well that it is here he must give his best atten-

tion, if he desires uniformity in his daily results. Let the printing bath be always of uniform strength, and the due proportion of acetate of soda and gold in the toning bath, and you will rarely, if ever, get into trouble. You know at once what reduction will take place in your print, just as though you saw it finished and dry before you; but let irregularity creep into the formula, and your day's work will certainly be more or less a failure. The rules regulating the sensitizing and toning baths must be rigidly observed, and to carelessness in this respect may be attributed the majority of printing failures, and general want of uniformity in results. To keep the silver bath in workable strength, a stock solution of silver—80 grains to the ounce of water—should be kept in readiness to the hand of the sensitizer, and 1 ounce of this solution added to every five sheets sensitized, care being taken to agitate the dish, so as to equalize the strength of the solution.

“*Toning*.—For toning the print, I believe the ordinary acetate bath is the best, giving, as it does, such beautiful warm tones, and which I myself am partial to. When the prints are taken from the printing-frame, they should be well washed in three or four changes of water, and, lastly, in water containing a handful of salt.

Toning Bath.

Chloride of gold ...	...	...	...	1 grain
Acetate of soda ...	...	...	...	35 grains
Carbonate of soda ...	...	...	...	5 „
Water ...	...	...	...	8 ounces

A convenient form of stock solution to add to the toning bath (as it loses energy) is as follows:—

Chloride of gold ...	...	...	...	15 grains
Acetate of soda ...	...	...	...	2 drachms
Water ...	...	...	...	1 ounce

A portion of the solution, regulated by the daily average of sheets of paper toned, should be added to the bath after the day's toning is done; it will then be in good condition for the next use. It will, however, always be found wise to have two or three baths in use, and work them alternately.

“The prints when taken from the toning bath should be again placed in water containing a little salt, and afterwards well and carefully washed in several changes of water.

“ *Fixing*.—For fixing, I believe a strong hyposulphite bath is the best, not less than 4 ounces to the pint of water, care being taken to neutralize with carbonate of soda or ammonia. For washing, the best plan, in my opinion, is to wash a comparatively short time, and have a boy constantly turning the prints over during that period; first turning them all face up, and then going through the whole batch again, and turning them in a contrary direction, and so on.”

AT THE AUTOTYPE WORKS, EALING DENE.

WE have had the pleasure of visiting in our time the three largest carbon printing establishments in Europe. In 1869 we went down to busy Newcastle at the invitation of Mr. J. W. Swan, and had the good fortune to see the interesting process of printing photographs in carbon as practised by that gentleman. As our readers know, in the Swan process the tissue, after printing, was placed, face downwards, on india-rubber, and when the image had been developed by warm water, transfer paper was put upon it, and then the rubber sheet removed from the back by softening with benzole. The Swan process, if not so simple as that now practised, was thoroughly practical, and gave pictures that bear comparison even with those now produced, facts that were fully borne out by the Braun establishment in Alsace, which worked Swan's patent. This we visited in 1870, when France and Germany were on the eve of strife. The mountain villages, we remember, were teeming with excitement, and the blue hills of Alsace were soon to be disturbed by the rude shock of war. Dornach was a contrast to Newcastle; it is not far from the Swiss border, near Basle, surrounded by wooded slopes and sweet pine forests. At Dornach, the Swan process was to be seen on a larger scale than at the home of its birth. Paintings from most of the European galleries were reproduced by its means, of magnificent dimensions, and we recollect to this day some excellent facsimiles from the Sistine Chapel. The art treasures of Rome, Munich, Paris, and other European capitals were here reproduced in large quantities, and Braun's establishment became famous throughout Europe, both by reason of the beauty of the work, and its permanence.

We were fortunate in being permitted by the late Mr. Johnson to see his simplification of the Swan process, when this was still under elaboration at his residence in Brixton, the simplification in question being the germ of the single transfer process. Mr. Johnson's important discovery was the fact that you needed no cementing material to hold fast the tissue during development; if you soaked the tissue in water and clapped it down on any impermeable surface, the image remained on that surface by reason of the atmospheric pressure against it. This fact Mr. Johnson must have shown us more than ten years ago, but it was only recently that we visited the Autotype Company's works at Ealing Dene, and were gratified with a sight of carbon printing carried on at the present day upon a large scale and under the most favourable auspices. We had expected much, but what we saw far exceeded our expectations.

The Autotype Works are under the direction of Mr. J. R. Sawyer, his partner, Mr. W. S. Bird, occupying the post of general manager in town. The group of buildings at Ealing shelter a *personnel* of eighty, and the manner in which the work is organised and subdivided proves the presence of a master mind somewhere about the premises. A large number of young women find employment in the Works, especially in the retouching, mounting, varnishing, and mechanical-printing rooms; but in the taking of negatives, sun-printing, and development of prints, only assistants of the male sex are employed. Mr. Sawyer was good enough to conduct us personally round the establishment, and if he will permit us here briefly to thank him for his courtesy and attention, we will at once proceed to tell the reader what we had the pleasure of witnessing.

Making the carbon tissue is naturally the first thing to look at. Here is the mixing room, where the proportions of pigment, gelatine, sugar, &c., are mixed, and the bichromate added, when the tissue is to be produced ready sensitized. Carbon tissue, we may inform the uninitiated, looks very much like black court plaster. The pigment mixture, kept at a temperature of something above 120° F., is kept turning in a drum for upwards of an hour to ensure perfect mixing; the pigments employed are Indian ink or vegetable black, with, perhaps, alizarine or indigo, or the oxides of iron or sepia. In the finest tissues for enlarging purposes, only Indian ink is used, for this pigment of all the others is so fine that it may be filtered through cotton wool. The

warm mixture is now transferred to a trough in the coating room. Over the trough is an endless roll of paper, and this dipping down into the trough is then passed upwards over rollers. The room is not only maintained at a warm temperature (70° F.), but there is above a huge ventilator with a fan worked by an Archimedean screw, and this fan, carrying away the atmosphere above, causes a stream of warm air to be constantly flowing through the apartment. The consequence is, that before the coated paper has proceeded very far over the roller, the black gelatine has set; the tissue comes running along a travelling bed, and here it is cut into lengths of twelve feet, which, one after another, are taken up by an assistant by means of a sort of haymaker's rake, and hung up to be further dried. In four or five hours the tissue is quite dry. About 1,000 feet a day are made in this room, but with the beginning of spring, when the demands of photographers increase, a second and much larger room is made use of, where 6,000 feet of tissue can be dried at a time.

Here is the laboratory where the transparencies are made for enlargements. This is very delicate work indeed, and is kept apart from the ordinary printing. As we have said, a special tissue is necessary. The glass to receive the transparency is coated with gelatine, which is rendered insoluble; the tissue is printed under the negative to be enlarged, coated with collodion, moistened in cold water, and then developed upon the glass. That a trial transparency has generally to be made first of all goes without saying, for so much depends upon the transparency; the development takes place within a few minutes of the wet print being put upon the glass—they do not believe in waiting at this stage at Ealing—and is first treated with warm water, and then hot (perhaps 130° F., or 140° F.), for the insoluble gelatine upon the glass surface is a famous material for holding fast the image.

The transparency is next given over to the enlarging and reproducing department, where we meet an old friend, Mr. Burton, to whose management Mr. Sawyer has entrusted this branch of the work. It is a very large branch, and as, in the making of enlargements, it is necessary to have condensing lenses of larger size than the transparencies, the apparatus here is well worth studying. One pair of condensers measured twenty-two inches across—the largest, we believe, made—and they weighed

not less than a hundredweight. Oxy-hydrogen lamps are employed for producing the negative from transparencies, the illumination being not only amply sufficient, but more constant than daylight. The plates and baths employed are obviously of large size, and one of the latter we measured was fifty-four inches by forty.

These baths are well worth describing. They are not dipping-baths, but swing on a pivot, so that they may be made to assume a horizontal position at any moment. They are of wood, the interior being coated with asphalte, beeswax, and boiled linseed oil. That they are economical with respect to the amount of silver solution required may be inferred from the circumstance that the large bath, of which we have given the dimensions, requires but five gallons of nitrate of silver; a dipping-bath of the same dimensions would probably require three times the quantity. To use the bath, it is sloped at the ordinary angle of a dipping-bath, when naturally all the solution runs to the bottom. The top side is lifted, and the huge plate laid down upon a series of ebonite pegs; then the bath is turned on its pivot until it assumes a horizontal position, when the solution at once, in one clean sweep, flows over the plate, and remains upon the film as long as the bath is horizontal. After a few minutes the bath is tilted back again on end, and the plate allowed to drain in an upright position and in a moist atmosphere as long as the photographer desires. Thus the bath saves both trouble and silver. In the series of dark rooms there were eight enlarging apparatus, the illumination necessary for developing the plates being provided by a row of gas jets behind coloured glass, the jets being put up and down as occasion required, like the float or footlight of a theatre. Mr. Sawyer had kindly given us permission to note everything we saw or heard, and we at once set about doing our best for our readers. But it was a curious coincidence that our friendly guide always seemed to find most to say when it was darkest, and when, of course, pencil and note-book were not to be seen; it might have been accident, of course, but the "flow of language" from our host's lips was never faster than when we visited Mr. Burton's dark rooms.

They never photograph anything in a straightforward manner at Ealing. They always appear to be shooting round the corner with their cameras, and, what is more, Mr. Sawyer intimated that it would be a very good thing indeed if other photographers—

supposing they desire to print in carbon—were to follow the example. Everything photographed direct at Ealing is taken through the intervention of a mirror, and therefore the lens never points in the direction of the object. A reversed negative is in this way produced, capable of being printed by the single transfer process, and pictures thus printed are likely to be as good again as those developed through the medium of a support. As a matter of fact, there are very few cameras, properly so-called, used at Ealing at all; huge dark-rooms are employed, in which skeleton frames are set up, and these answer the purpose of cameras. Paintings to be copied at Ealing—and they are large and many—are set up in the open air, with a big screen at their back to stop the light; from an embrasure or port-hole in an adjacent wall—of course, at an angle—peep forth mirror and lens, and if you go in to see the camera itself, there is nothing but a skeleton frame, scarcely discernible in the dark, at the end of which is the ground glass whereon the picture outside is reflected. In a word, the orthodox photographer gets a good deal bothered over the radical way in which the work is done.

There is a fixing-room where nothing but cyanide is employed, and a varnishing-room, heated to a warm temperature, where nothing but varnishing is carried on all day long. There is a retouching room for negatives—the black-lead pencil and indigo being the materials employed—in which constant employment is found for a dozen assistants: and the finishing-room, with a *personnel* of the same number, where the prints are mounted with starch and finished. The printing-room is a long glass-roofed building, practically contrived, but with little novelty; large tables bearing the printing frames are mounted upon wheels which run on a series of tramways; in fine weather these tables are pushed out into the open air, in wet weather the printing takes place under glass.

The developing-room affords a very busy scene. On either side of a large apartment are water-tanks heated by steam. The carbon tissue—for the most part single transfer prints—are brought here as soon as printed. We saw a picture upwards of four feet long developed. A sheet of stout white paper was placed on a flat board and moistened with water; the big carbon print was thrown into a cold water tank, taken out again, and placed face downwards upon the white paper. The squeegee was used to ensure contact, and then the whole was thrown into

warm water. There was no awkwardness about the operation; the tissue gradually dissolved away, and the skilful assistant turned and twisted the huge print, allowed a jet of hotter water to play here and there as occasion required, and, in the end, produced a magnificently toned picture. For copies of engravings, which are but black and white, Mr. Sawyer employs a tissue loaded with pigment, which ensures bright lights and shadows; but in the case of half-tones this description of tissue is avoided. There were prints of sepia, red chalk, and purple, all being developed at the same time. In the case of double transfers, the white flexible support which Mr. Sawyer himself has devised proves invaluable, for not only may you bend a print to your own wish, but the material being white, it permits you to develop as delicately almost as in the case of single transfers which never leave their paper basis.

Mr. J. R. Sawyer gives the following particulars to produce carbon pictures on opal:—Take a piece of clean opal from the rack, and immerse it with the printed tissue in perfectly clean cold water; the temperature of the water should not exceed 56°, or at the most 60° Fahr., and in hot weather it must be kept down to something like this by the introduction of pieces of clean ice from time to time, or by standing the tray in an outer one, containing rough ice and salt. Almost as soon as the tissue enters the water it begins to curl, first inwards—*i.e.*, towards the gelatine surface; in a few seconds it will begin to relax and soften; now pass the palm of the hand over it to remove any adhering air-bubbles, and when it has nearly straightened itself out (but not quite) adjust it over the surface of the opal reposing at the bottom of the tray; lift both out together and place upon the wooden stool for the application of the squeegee.

To squeegee a carbon print is, like many other things, very easy when one knows how. The printed tissue being in its proper position upon the opal, take the squeegee in the right hand, and hold the opal firmly with the fingers of the left; now apply the squeegee with a moderate, even pressure, a little past the centre—*i.e.*, nearer to the left hand; now, with an even steady stroke, sweep off the water clean over the right-hand end, and turn the plate round and repeat the operation for the other half the plate, commencing, as before, a little past the centre. The tissue will now be flat upon the plate; the squeegee should now be used

with some amount of force from the centre to the ends in each direction, so as to ensure absolute contact between the surface of the tissue and the grained face of the opal; the opal may be now placed upon a table, a piece or two of thick blotting-paper or bibulous board laid upon the picture, then a sheet of glass or metal, and upon that something heavy; it should now be allowed to repose for a quarter of an hour or so.

The foregoing method supposes that the negative is a reversed one, and that the print can be developed straight upon the opal; but should the print be required from a negative made in the ordinary manner, a modification will be necessary. A print from an ordinary negative developed straight upon the opal would be reversed. To avoid this, it must be developed upon an intermediary or temporary support, from which it can be transferred to the opal; this is best accomplished by using the patent flexible support, in the manner following:—Take a piece of the support a shade smaller than the plate, and treat it as follows: rub the glazed surface with a piece of soft flannel moistened with a little of a waxing compound composed of yellow resin six drachms, pure beeswax two drachms, turpentine one pint; having rubbed this well into the surface coating, polish it off lightly with a second piece of soft flannel, avoiding any heavy pressure; the action of a French polisher is exactly what is wanted; allow it to remain for a few minutes till the spirit has entirely evaporated, and the support will be ready for use.

Place the printed tissue and the piece of support in the tray of clean cold water, and when the tissue has expanded, bring the two surfaces into contact under water, lift out together, and place upon a zinc or glass plate resting on the wooden stool, the back for the tissue uppermost; apply the squeegee as before described, and allow the two adherent sheets to rest under a weight and between bibulous paper for a quarter of an hour. The development of the picture is carried on in the usual manner by placing it in water of a temperature of 110° to 120° Fahr., and calls for no special remark; the treatment does not differ in the least from ordinary carbon methods. After development, an immersion in the alum bath for a quarter of an hour, followed by a thorough rinsing in clean cold water, and the print developed upon the support may be considered finished.

The transference of the picture now resting on the temporary support is conducted as follows:—The picture should be allowed

to dry spontaneously; make up a solution of Nelson's No. 1 fibre gelatine two ounces, water eighteen ounces; soak the gelatine in the cold water, and raise to a gentle heat; when perfect solution has taken place, stir into it, with vigorous action, a small quantity of a thirty-grain solution of chrome alum, adding the chrome alum solution in very small quantities, and stirring vigorously. It is difficult to say how much may be added, as gelatine varies very much in its behaviour with chrome alum. Probably this amount of solution will take about six drachms of the chrome alum solution; if too much be added, the whole goes into a viscid mass, and may be thrown away at once; if too little, the fluid will be too thin and watery, and not have sufficient strength to hold the picture firmly to the opal. A few experiments, and the loss of a little gelatine, will soon show the operator where he has got to.

The transfer solution being ready, and at a temperature of about 100° Fah., should be placed in a tray large enough to receive the opal; or the opal may be placed on a levelling stand, and some of the solution poured upon it, distributing it over the surface with a piece of clean paper. The picture on the temporary support, which should have been placed a short time previously in cold water, is now applied to the surface of the opal resting in the gelatinous solution in the dish, being very careful to exclude air-bubbles, or it may be imposed upon the plate covered with the gelatinous solution resting upon the stand; the squeegee is now applied as already described; the opal, with the temporary support adhering to it, is allowed to dry spontaneously, and when perfectly dry, the support may be stripped from the glass, leaving the picture firmly anchored to its grained surface. The piece of support will only require to be rubbed over with a little of the waxing compound to be perfectly ready for use again.

A great deal may be done to a picture in opal with very little trouble. A judicious application of ink eraser will improve the vignetting, put in high lights, clean up margins, soften harsh shadows, and impart an artistic character to the work. From good and suitable negatives, prints on opals have beauties peculiarly their own; they are exquisitely soft and delicate in appearance, and are susceptible of a great range of artistic treatment, both in monochrome and colour

MESSRS. A. & G. TAYLOR AT FOREST HILL.

"You must make a good many collodion transfers here," we said, as our blinking eyes penetrated the gloom, and we became aware of animated beings busily moving to and fro. "Two hundred and eighty is an average day's work," was the reply, "and we shall do that number to-day."

It was like the lower deck of a ship—dark and vague, and with wooden machinery on every hand, the active ship's crew going about its work quickly but quietly; and yet not so much like the 'tween decks as a carpenter's room under the theatre, where there are all sorts of beams and sides and movable frames to be seen. Only there was this difference: if you go into the lower regions of the Theatre Royal Comus, among the "sinks" and "traps," you cannot touch a beam or a cross-piece without leaving an impression behind of your fingers, while in Messrs. Taylor's big enlarging room there is, as one might imagine, not a speck of dust to be encountered. As your eyes get accustomed to the darkness, you begin to perceive all the clever arrangements that exist for rapid and accurate working. There are no less than twenty-four lenses in use, and, in consequence, twenty-four enlarging stands; the lenses and cameras are let into the roof, or, at any rate, depend therefrom, so that the collodion plate for the enlargement only requires to be laid down in a horizontal position to receive the image.

But let us explain a little more definitely. It is a long room with an arched roof. There are four principal assistants, and each assistant has charge of six lenses; the six lenses are arranged in a group, so that they may be all served from one and the same platform, the assistant requiring to mount a couple of steps to reach this platform. Here is a sketch showing how the instruments are arranged. Above is the camera (C). Daylight through an opening in the roof comes in at the back of the camera and illuminates the negative, which is in a slide (D). The image thrown by the lens is vignetted by the diaphragm (B), and then falls upon the table (A). It is upon this table that the collodion plate is laid. The focusing is done by the assistant moving the table up or down, a single screw permitting this action without difficulty. The table (A) may, in fact, be moved horizontally as well as vertically, by an equally simple arrangement.

It will be seen at once how quickly an arrangement of this kind works. In the first place, the light comes down almost vertical, and therefore it is the best of all lights for the purpose. In cloudy weather the light is not interfered with in the least; but in bright sunshine a screen of opal glass is employed. The



assistant slips the negative to be copied into the camera; he focuses at A, measures with a quarter-plate in his hand the size of the head (for all heads are enlarged to this size), and then calls for a sensitized plate. A lad, whose duty it is to supply him with these, withdraws a collodionised plate from the bath, drains it, and simply places it on the table (A). There is no dark slide required—no loss of time involved in fitting the plate into an apparatus of any kind; it is bare and moist, and laid on the table. An exposure of two minutes suffices, and the film is then carried off for development.

All twenty-four lenses are of the same make—No. 1B Dallmeyer's; all the plates are coated with the same collodion, and all are treated with the same developer, &c. Consequently the work of all assistants should be the same if they work well and conscientiously. The Messrs. Taylor thoroughly believe in system, and they have here initiated a self-checking method that cannot fail to work satisfactorily.

We have been talking about collodion transfers only, but opal-coated plates are here produced under the same conditions. But

we ought, perhaps, to go back a moment to the preparation of the glass, &c. The chief difficulty in making collodion transfers, or collodion enlargements on opal, as many of our readers know to their cost, is the tendency of these to stain, and on this point we had some conversation with our good friend the manager. In his opinion the staining is due, in nine cases out of ten, to the glass. "We put our glass plates in acid for a week," said Mr. Smith, "before we attempt to use them. We never albumenize, and we always employ *old* collodion." Let our readers note this. There is simply no firm in the world which has so much experience of collodion transfers, and on behalf of our readers we tender our best thanks to Messrs. Taylor for this practical straightforward advice. After leaving the acid bath, the plates are rubbed with spirit, and are then fit for use. The plain glass (which is very thick, by the way, for thin glass bends under the squeegee, and then the transfer, when stripped, is not so solid) is dusted with talc before coating with collodion; the pot-metal, which is smooth, and not ground, is coated with collodion, without, as we have said, receiving any preliminary film of albumen.

When the exposed plate is taken from table (A), it is at once developed; the developing, fixing, and washing arrangements being situated on one side of the long dark room, while the coating of the plates and sensitizing are confined to the other. Rising out of the developing sink is a wood block, about five inches square on the top, which makes a suitable resting-place for the plate. There is no toning. The development is complete within two minutes, and the plate then put under a rose of running water; but it is not allowed to remain here many minutes, as the stream of water is not found to arrest development. The photograph is speedily popped into the hyposulphite bath, washed again thoroughly, and then backed at once. A good quality paper, not too stout, which has received a facing of gelatine, is wetted, placed upon the collodion plate, squeegeed firmly, and then the overlapping margins of paper skilfully cut off by rasping them against the sharp edge of the glass with a wooden paper-folder. When dry, the transfers strip without the least difficulty, and are then mounted on card-board for touching and painting.

To tell the truth, we are rather glad to get out of the enlarging-room, for the ether fumes cause one's eyes to smart a little sharply. Mr. Smith tells us, however, that none of the

assistants suffer after being at the work for a few days, while cases of sickness are almost unheard of, and have certainly never been traced to the inhalation of ether fumes. You have to be very careful in opening and shutting the doors in this portion of the building, and the invariable rule is to close one before you open another—a regulation which is invariably complied with. On looking round once, to see if a door had actually closed behind us, and hesitating whether to go back, or run the risk of letting it be as it was, we caught sight of a warning in big letters :

EVERYBODY SHUTS THE DOOR BUT YOU.

“It’s a very good idea, isn’t it?” said Mr. Smith. “I brought it back with me from Chicago, and put it up here.” It was a good idea, certainly; but one don’t like to be caught napping, for all that. Had no one been looking, we should have gone back and kicked that door. Only fancy being brought to book by a pale-faced bit of wood!

The room for sensitizing paper is adjacent.

The strength of the printing-bath in vogue here is thirty-five grains to the ounce, and in respect to the collection of residues, a most systematic plan is adopted. All waste solutions containing silver, from whatever source they come, are first treated with hydrochloric acid, and subsequently with liver of sulphur. That is to say, having been collected in large jars, hydrochloric acid is added to precipitate chloride of silver; the liquid is then drawn off into another receptacle, into which liver of sulphur is put, which naturally brings down any other silver that may be present, in the form of sulphide. By this exhaustive treatment every particle of the precious metal is recovered.

Downstairs is the printing room. It is a rule, and a very good one too, to fix down both vignette and negative in the printing-frame, at the commencement of operations, with strips of gummed paper; in these circumstances, there is nothing to fear from the carelessness of printers in permitting negatives or vignettes to slip when changing the paper, and thus getting the picture out of the centre. As Forest Hill prints for a score of branches, it is very necessary to put a distinguishing mark on the prints as they are produced; the printer who withdraws the picture from the frame does this, pencilling on the back an initial letter corresponding to the town whence the negative has come.

The spacious washing-room is next door. There are three

large washing troughs of wood, lined with lead and coated with shellac. A huge rose above supplies the water, which, when it has risen to the top of the receptacle, is emptied by a syphon. Blistering of the albumenized paper is almost unknown; but the addition of spirit to the sensitizing solution, in the proportion of about 3 per cent., is regarded as a preventive measure against the disagreeable phenomenon. The printing is accomplished under a glass roof, which, in summer time, is covered with tissue paper.

We have no time to speak of the series of printing-rooms, mounting-rooms, sorting-rooms, &c., through which our courteous guide leads us. It is the club portrait that occupies all these busy people—a collodion transfer painted in oil; the finished production may not have much claim to rank as a work of high art, but there is an important point in all these portraits that has probably had more to do with Messrs. Taylor's great success than anything else. It is, that however much dress and garments may be coloured and beautified, face and features are simply covered with an even wash. In other words, advantage is taken of the photographic shadows that already exist on the portrait, and these supply sufficient contrast, without there being any necessity to tamper with the likeness by the application of body-colours.

In an establishment which gives employment to between five and six hundred employés, it is necessary to have strict rules and regulations. The hours of assistants are from 8 a.m. to 6 p.m.; the girls, however, not coming until 9 a.m. But six o'clock is the maximum time, and many are released from their work, especially in winter, some time before this. Wages vary, of course, with the skill and capacity of the assistant; but two young ladies were pointed out to us in the painting room whose average earnings were three pounds a week.

One word on the subject of collodion making, before we close our rapid sketch. Collodion is generally three months old before used, and sometimes is even permitted to rest a year before employment, Messrs. Taylor having a firm belief in a ripe material. It is all made on the premises. The pyroxylin employed is half high, and half low, temperature material. These are the proportions:

Pyroxylin	...	...	...	...	9 ounces
Ether	...	...	...	...	4 gallons
Alcohol	...	...	...	...	3 ,,

In twenty-four hours dissolution is complete, and the collodion is then turned into a mixing stone cask, having the tap half way up. Here it remains a week or more to settle, and is then drawn off and put into other stone jars, where it remains till required for use. As only half the contents of the mixing cask can be drawn off at a time (since the cock is half way up), freshly-made collodion is always mixed with a proportion of old. In a word, the collodion is treated in precisely the same way as connoisseurs treat their whiskey, who by this means are able to detect a flavour of the old "cratur" in every new supply.

MESSRS. ELLIOTT & FRY AT BAKER STREET.

THERE is a comfortable look about the Talbotype Gallery in Baker Street, at once reassuring to the visitor. If we are to suppose that sitters are for the most part in an uneasy, not to say excited, state of mind when they enter a studio, there is much in the establishment of Messrs. Elliott and Fry to allay such feeling. There are no reception rooms, in the usual acceptation of the term. The visitor walks upstairs from the vestibule, and finds himself in a gallery of paintings and photographs. The pictures, too, are of such a character as to at once attract attention. Here is the painting that brought Hubert Herkomer his gold medal at the Paris Exhibition, and had very much to do with securing him the coveted A.R.A., "The Last Muster," a scene at Chelsea Hospital. Another painting, equally fine, if smaller, "Im Walde," by the same artist, also graces the walls of the first gallery, with other fine productions; while as we progress through the establishment other no less worthy pictures meet the eye. Mr. Fry, who courteously acts as cicerone, is evidently a great lover of the young Scotch school, for we meet, also, with some fine sea studies of Colin Hunter, Peter McNab, and others.

It is only when we leave the first gallery and proceed to the second and third, that we come among photographs. It is nearly all large work. There are some fine carbon prints upon opal or porcelain, fifteen by twelve and smaller, not only more varied in tone than collodion transfers, but naturally more permanent; enlargements in carbon of Lord Chelmsford "in his fighting

dress," a sort of Norfolk jacket; and next to him two other good pictures, the one vigorous and forcible, the other soft and harmonious to a degree, representing the brave and the fair—Evelyn Wood and Eveleen Rayne. "We try to show what photography can do in vieing with painting in the production of large artistic portraits," said Mr. Fry; and we think photographers would run portrait painters hard if they all succeeded as well as the eminent Baker Street firm. There is a striking portrait of the violinist Wilhelmj—or, as the British public choose to call him, William J.—and the last picture taken in England, genial and bright, of the Prince Imperial in evening dress. If an enlargement is to be made, Mr. Fry prefers, if possible, to secure a cabinet picture in lieu of a carte.

We will go upstairs. Shall we inquire terms at the little mahogany counter before we proceed to the studio? The brass rail and busy clerks behind it suggest a bank, and we will hope that it is as good as one to the proprietors. A guinea is the stipulated fee, and in these days, when half that sum is charged at any fashionable theatre in town for a stall, we think it exceedingly reasonable. To judge from what one sees, having your portrait taken is deemed by many an amusement *à la mode*, and there can be no doubt that ladies at the West End will pass an hour in a studio *pour se distraire*. The guinea entitles the sitter to a dozen and a-half cartes, or six cabinets. There is a clause about children: "Children under eight are charged half"—so the circular says, and we make a point of the statement, because Messrs. Elliott and Fry are, we believe, the first who have had the courage to make the announcement—"are charged half-a-guinea extra for the first set."

The studios are three in number: one, the smallest, is well adapted for vignettes, the others are of larger size. There was everything of the best downstairs, so we naturally supposed there would have been a north-light studio: But Messrs. Elliott and Fry did not build Baker Street; they had to take it as they found it. Their light is easterly. There is not only top side-light, but actually top light; but the latter, Mr. Fry assured us, was never used in taking gentlemen with bald heads. It is needless to say that every means of shutting off the light is at hand, together with what might be termed palm-leaf screens, which may be stood anywhere. Of backgrounds there were twenty-six in one studio, and notwithstanding the experience already

acquired in their preparation, there were, as a rule, two backgrounds rejected for every one kept. A fine Windsor Park picture—painted in distemper, of course—with a soft shadow falling from the trees in mid distance, was a successful example of a background.

The main feature of the studios was an elongated canopy stretched over the cameras. This canopy was no less than twelve feet long in one of the studios, so that the photographer looked through a sort of tunnel of this magnitude at his sitter. Every one has, of course, employed means for shading the camera, but we have never seen it carried to such an extent, nor carried out so successfully.

The rule of the establishment is to keep the sitter the shortest possible time in the glass room. Ten minutes, and sometimes five, suffice. "You cannot have secured a good portrait, for I was only taken twice during the few moments I was in the glass room—sometimes they take ten or fifteen of me," is not unfrequently the remark made to Mr. Fry, who prefers to get his sitters thoroughly at ease before they go into the studio at all. His dressing rooms are fitted up especially to this end; we went into seven of them, and they were all hung round with paintings, without a single photograph to remind the victim of what he shortly would come to. The rooms were admirably appointed—that goes without saying; but what will the reader say when he hears that gems by David Cox, Birkett Foster, J. D. Watson, and other celebrities adorn the walls in profusion? We should not like to say the sum at which the paintings in the Talbotype Gallery are insured for, lest we may be taxed with exaggeration, but we have said enough to show that they are of considerable value.

Cabinet pictures are evidently still the favourite *format* here, but the promenade is making way slowly and surely. At first it was proposed to call it the "Court portrait," but it is not always in this world as "man proposes." The promenade, unmounted, measures seven and three-quarters by three and three-quarters, and is mounted on cards supplied by Marion, having dark margins and gold bevelled edges. Albums are already being made for the promenade, and such portraits should, if mounted panel-like, three in a page, make a handsome show.

The negative rooms afford subject for more wonder. There are four rooms stored with them, and, strange to say, not packed

in paper, but loose and open in grooves. No special care in respect to heat or damp is taken, and the negatives do not suffer. Rising of the film or worm-marks are unknown, for Mr. Fry thinks that if negatives are properly varnished they run no risk. Yellow shellac varnish is employed.

The printing is done at a branch establishment at Barnet, where both silver and carbon work is carried on. Retouching is, of course, resorted to when necessary, and is for the most part carried out with a lead pencil upon the film. We should not like to say how many the *personnel* of the establishment musters, but they include several foreign artists of considerable ability.

Gelatine plates are already well known here in the studio, and the difficulties of development are now things of the past. To stop the light of his dark-rooms, Mr. Fry has found that paper saturated with uranium, and treated to a single coating of boiled oil, sufficiently protects the film during development, and he has no difficulty in securing pictures with one-tenth of the exposure given to a wet plate.

MR. WALTER WOODBURY AT SOUTH NORWOOD.

If we divide the history of photography into two periods, that which preceded collodion upon glass, and that which has followed it, we shall find in the second era no name more prominent than that of Mr. Walter Woodbury. Woodburytype, to the modern photographer, is as "familiar in his mouth as household words," and is, and apparently will be, for many years to come, the only photo-engraving process of practical and commercial value. What a fortunate idea to light upon, many have thought in becoming acquainted with Woodburytype for the first time, and how lucky Mr. Woodbury was to have conceived it! Few consider the matter seriously, nor dream that there have been tedious experimenting and elaborate labours preceding the work.

Mr. Woodbury appears to have never been without a camera since he was old enough to carry one. Articled to a civil engineer, he had barely served his time, than he went off to Australia, when thirty years ago the popular tide set in that direction. Like Moses with the green spectacles, he forthwith

purchased a camera with his available cash—about the most useless thing he could possibly buy, without chemicals and other necessities for the taking of photographs. However, the latter were afterwards acquired, when Mr. Woodbury had suffered some of those vicissitudes which the bard tells us “acquaint a man with strange bed-fellows.” Indeed, so successful was he with his camera, when once firmly on his feet, that in 1854 the prize medal was awarded to him for photography in the Australian Colonies.

Quitting Australia, we find Mr. Woodbury in 1857 and 1858 in Java, taking pictures for the Sultan, and to prove how well these were executed, we have but to refer the reader to the charming transparencies of scenery in the Tropics, published in 1859 by Negretti and Zambra. We were looking at a series the other day of these glass stereoscopic slides, the photographs printed upon albumen, and we fearlessly assert that nothing of the kind which has been produced in recent years excels the delightful pictures of luxuriant foliage and eastern vegetation which Mr. Woodbury produced nearly a quarter of a century ago.

What is this curious little picture Mr. Woodbury brings to us? It is in a tiny frame, and represents a table decked with fruit and flowers, coloured vases, and gilded ornaments. It is a photograph, and yet it is resplendent in colours. Mr. Woodbury laughingly strips off the backing, and then we find it is a Woodbury transparency on glass, with a roughly-coloured ground beneath. It was made in 1868, and represents one of the earliest examples of this kind of work—a photographic image over a coloured groundwork—which, from that day to this, has been brought before the public under one name and the other. The French patented process, of which we have heard so much lately, about *photographies des couleurs impressionnées par la lumière*, is, of course, simply one example the more of this old dodge.

But we must come to the present day. Mr. Woodbury has plenty to show us, and here at Manor House he has laboratory and workshops full of interesting matters. This oblong little box standing on end, about fourteen inches high, and six inches broad, is Mr. Woodbury's balloon apparatus. It is not difficult to explain. It is carried into the air by a small balloon, which is tethered to the ground by an electric wire. It hangs down

from the balloon exactly in the position in which we see it standing upright on the table. The lens is uncapped at will by a revolving disc, which revolves once every time the operator sends an electric current from below. He sees when the balloon has done gyrating, and between the turns makes his exposure. He can make four exposures at every ascent of the balloon, for he has four plates. These four plates are fixed to four faces of a cube, and this cube also makes one quarter turn (bringing another face, or plate, into position) whenever the operator sends an electric current up to the balloon from the earth. The system has the double advantage that only a small balloon is necessary, and that no risk is incurred by an aeronaut; for according to recent experience, there seems to be no difficulty about bringing down a war balloon if you can get a cannon within two thousand yards of it.

“What a capital workshop you have here!” we say; it is divided into four compartments for workmen, a broad passage running along at right angles to the divisions. “It is a very useful one,” says our host, and then he adds, briefly, “I made it out of a four-stalled stable.” And so he had; verily Mr. Woodbury is an inventor to some purpose.

Mr. Woodbury took out his patent for Woodburytype in 1864, but he no longer practises it in its original form; the process is now reduced to a very simple matter, Mr. Woodbury proceeds to show us. As our readers know very well, this modified process has already appeared, and what we are about to describe is therefore nothing new. Indeed, we have no doubt that anybody interested in the subject would be quite as welcome to witness the simplified process as we were. Seeing is believing, however, and it was for this reason that we begged Mr. Woodbury to receive us.

Imprimis, Mr. Woodbury takes a piece of carbon tissue and prints a picture upon it. This picture he develops upon a piece of glass—patent plate glass. He has now, therefore, to all intents and purposes a carbon transparency, which every carbon printer knows how to produce. This carbon transparency, still on glass, is, when dry, rubbed over with a little pomatum, and then a sheet of tin-foil put upon it. The two are now run through a small rolling press, such as every photographer possesses, with the result, of course, that the tin-foil is pressed into the carbon print.

The carbon print, with its facing of tin-foil, is next carefully put into an electrotyping bath, where it is left for some hours. Copper deposits itself all over the tin-foil, and when the plate is raised from the bath, instead of presenting a shining silver surface, it is covered with beautiful red copper.

Now for the next step. A thick slab of glass covered with resin is put upon an oven or water-bath to warm. The resin melts so that the top surface is adhesive. Under these circumstances, we take the electrotyped plate and press the copper surface firmly upon the resined glass. The whole is now cooled, and there remains attached to the glass block the copper and the tin-foil; the carbon transparency comes away. You see the sheet of tin-foil now, and find it has taken a cast of the carbon transparency, and this cast or mould, backed up by the copper and the resined plate, represents the printing block. From this printing block prints may then be taken in transparent ink, in the ordinary well-known manner.

The carbon transparency which comes away so easily, thanks to its treatment with a little pomatum, may be used again and again for the preparation of printing blocks, so that a dozen may be made, if necessary, without difficulty. No special apparatus whatever is necessary except the actual printing-press (which is a very simple matter), and a battery. Provided with these, any photographer might begin Woodbury printing to-morrow.

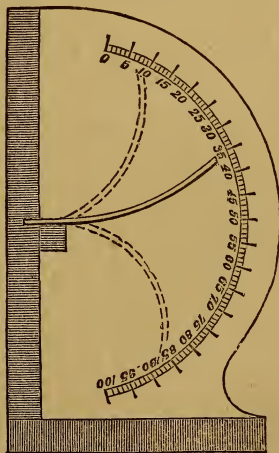
An ingenious little apparatus which Mr. Woodbury has to aid him in his work deserves description. It is a veritable *multum in parvo*. It is a small iron casting, measuring about twelve inches, and its framework represents a levelling stand. Place over it an iron plate, and below a spirit lamp, and it yields a hot plate for coating the glass block with resin. Put upon the iron plate a little oblong vessel filled with water, and there is at hand a water-bath, useful for melting the resin (a lower temperature being now necessary), to affect the adhesion of the electro plate; again, this little water-bath may be removed, and a deep upright vessel substituted, also to contain warm water, but with a grooved interior, employed for the development of the carbon prints.

Paris, it seems, has been taking up the modified Woodbury process very warmly; so little apparatus is required, and the manipulations have been so much simplified, that the photo-

grapher has it in his own hands now to multiply impressions, and print them by photo-engraving. Hutinet and Lamy, of Paris, are occupying themselves with the manufacture of the carbon tissue, &c., and photographers of high rank—like Nadar, and others—are seriously setting to work to print in Woodbury-type instead of silver.

About the preparation of the printing ink, in respect to which a good deal of mystery has been made, we may mention that it is but gelatine and water with any colour added, such as Indian ink, or alizarine; in summer one-fifth to one-sixth gelatine to water, in winter more water. The ink is kept warm in the water-bath we have spoken of.

Lastly, here is the filigrain process. "I call this the cheapest photographic image ever made," says Mr. Woodbury; he takes a carbon print developed on paper, hard and dry, of course, and sends it through the little rolling-press, in company with a sheet of plain paper. The consequence is that when the latter comes out, it has a water-mark of the same design as the carbon print with which it has been pressed in contact. Any design may be thus impressed. Here are visiting-cards with the portrait of



the visitor to be seen if you hold them up to the light; writing paper with all sorts of fancy designs; trade-marks, labels, &c. Filigrain, if it is the simplest, is also the most fascinating of Woodburytype applications.

Photographers working any process where gelatine is used, whether in the making of dry plates, working the carbon, Woodbury, dusting-on, or collographic processes, should be provided with a hygrometer, of some sort or other, to test the amount of moisture in the room they are working in. Mr. Woodbury has devised a very simple form, which is shown in the diagram (page 49), and can be made by anyone in a few minutes. It is constructed of two pieces of wood, one forming a base to support the other. In the upright piece a notch is made with a fine saw, about half-way up, and in this is inserted a piece of carbon tissue, about four inches long and an inch broad. At the back is tacked a piece of card with a scale marked on it, the lowest number representing 100, and the highest zero.

With a moderate amount of moisture, the paper will remain almost horizontal, in a very damp atmosphere will take the curve of the lower dotted line, and in an excessively dry state of the air will curl upwards as in the higher one. In combination with thermometric observations, probable changes in the weather may also be foretold by it.

MESSRS. HILLS & SAUNDERS AT PORCHESTER TERRACE.

SOME years ago, when cabinet pictures were more of a novelty than they are now, a practised amateur of our acquaintance used to exhibit on his mantelpiece two well-finished prints which he considered representative photographs of English and French portraiture. The one was bright, clear, and well modelled, a cabinet portrait from Reutlinger's studio on the Boulevard Montmartre; it represented one of the actresses of the *Palais Royal*, and although, no doubt, a good deal of retouching had been done to the negative, the picture was full of *esprit* and "go," and altogether a delightful result to look upon. The British portrait did not pretend to such vivid clearness; it was more sketchy than vigorous, and was soft and delicate to a degree. It was that of a lady in a deer-stalker's hat, with fair curls, the features rounded, and the hair as soft as silk—a happy portrait of the late Miss Amy Sheridan, and the work of Messrs. Hills and Saunders.

Messrs. Hills and Saunders have always taken high rank in

London. They may be found "at home" at other places besides Bayswater, at Eton, Aldershot, Sandhurst, Oxford, and Cambridge; but the studio in Porchester Terrace is, we believe, the head-quarters. We have said studio, but the word is something of a misnomer. Any casual passer-by would fail to recognize the exterior as that of an eminent firm of photographers, and when the visitor has rung the bell and been ushered into the drawing-room, the fact is no more apparent. There are a good many photographs on the walls, and several albums on the table, but scarcely more than you would find in the reception-room of a private gentleman. If Messrs. Hills and Saunders will excuse the remark, there seemed to us an amateur-business-like aspect about the place, which certainly had this effect, that it set the visitor at his ease, and did away with all formality and nervousness.

The enlargements to be seen were none of them on a very large scale, but all exhibited a soft, pear-like tone that was difficult to understand at the first moment. They were one and all pictures upon porcelain, or, rather, pot-metal. Some were by the carbon process, the medal picture to which we have just alluded being one of these; but the majority had been secured by the aid of the powder process. Finely-grained opal glass was the basis in all cases, the ground surface permitting the artist to touch with stump or brush without previous varnishing. The powder process practised by Messrs. Hills and Saunders does not differ in the main from that detailed by Mr. Valentine Blanchard (p. 61). But there is this particular precaution to be taken, Mr. Cowan tells us (whom, by the way, by a breach of good manners, we have failed hitherto to introduce to our readers), namely, that hand-ground opal is chosen. A cheap form of grinding has lately been introduced, by directing a blast of fine sand against the opal surface, which, however well it may answer for other purposes, is not suitable for the preparation of a glass surface that is to serve for photographic work of this kind. The sand particles are not equal in their action, and the consequence is that the surface is pitted here and there. It requires no magnifier to show these minute cavities, which can be well seen on closely examining a glass surface held horizontally towards the light, and pigment lodged in these cavities is very apt to leave the glass surface subsequently; a hand-ground plate, on the contrary, has a matt milky appearance, with a surface perfectly free from such imperfections.

The cabinet portrait is the favourite *format* still at Porchester Terrace, and Mr. Cowan, in turning over the leaves of a large album, showed how the backgrounds in every case were different. "Oh, I know where you had that taken; that's So-and-so's background!" is a remark not unfrequently heard; but at Bayswater, by the simple arrangement of a few ferns, dried palms, grasses, and rustic fencework, no two pictures are ever alike. Moreover, if it is a question of enlargement afterwards, these grasses, &c., help to avoid a lot of retouching.

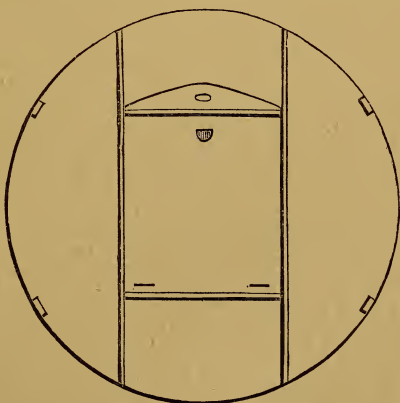
Leaving the drawing-room by folding doors, you pass through an ante-room into what was evidently a conservatory once upon a time, but is now a well-lighted glass-room of wonderful capacity. Here again the visitor feels at his ease; there is no trudging up a flight of stairs, and getting hot and flurried in the process; you might pass into the studio without knowing it, if it was not for a curious sort of camera that stands in the path, and never takes his glassy eye off you. "We'll tell of you, my fine fellow!" was the idea that occurred to us, and we shall now do so.

This camera lives alone by itself. Mr. Cowan told us in confidence, and we repeat the secret under the same reserve, that there was no other camera in the studio. This is not, we believe, because Messrs. Hills and Saunders' means are inefficient to provide a second instrument, so much as that the one now in possession of the floor of the studio has no rival. We ourselves observed him work his optic more than once, without any visual agency, just to intimate what he could do when he tried; while his ability to secure a carte or cabinet or a ten-inch plate is only equalled by the readiness with which the base-board can be elongated, and his body converted into a copying-camera, when he goes on reproducing *clichés* without making the least difficulty about it. Despite its solidity, this occupant of the glass room turned with considerable ease; near its foot were two cells of an electric battery which supply its vitality, and cause either a drop-shutter to fall, or a cap to be lifted, in obedience to its master's wish. The latter, provided with electric wires, may, as in the case of the Cadett shutter, move to some distance from the camera, and approach and talk to the sitter while he exposes his plate. To describe intelligibly the clever electrical arrangement which Mr. Cowan has ingeniously brought to bear would be impossible, nor would it serve any useful purpose, since to

use such an instrument a man must be something of an electrician, and if he is this, he would probably do his best to contrive a plan of his own. The making and breaking of contact, and magnetising and de-magnetising of a piece of iron, is, of course, the principle upon which the actions rest; most people know that if you twist wire round a bit of soft iron, this soft iron will become a magnet any time that an electric current passes through the wire. The electric current, in encircling the iron, magnetises it; break the current, and on the instant the iron loses its magnetic virtue. Mr. Cowan simply makes use of electro-magnetism, or magnetism evolved from electricity, to work his camera.

Cabinet and carte plates are made interchangeable in a simple way. The back of the camera is a flat circular disc which revolves; it is, in fact, very similar to a turn-table on a railway, only it is perpendicular instead of being horizontal. There are a pair of rails—or grooves, rather—running across the turn-table, and into these grooves is slipped the dark-slide. If a cabinet is wanted the plate stands on end (fig. 1).

Fig 1.

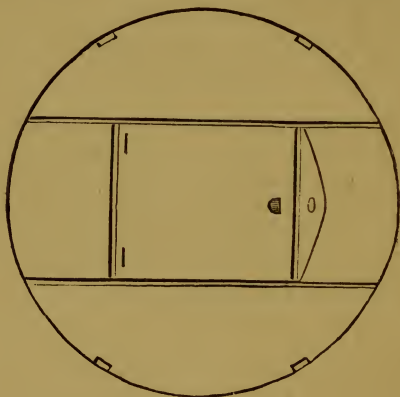


If cartes are desired, the table is turned, and the dark-slide stands ready for securing three cartes (fig. 2).

The glass-room may be said to be two rooms joined at right angles, and so favourably situated in respect to a north aspect, that it is frequently possible to work without blinds at all. A blue banner screen, some two feet square, stretched stiff, and

borne upon a pedestal, so that it may be suitably adjusted over the head of the sitter, is in some cases the only shade employed in the studio. Mr. Cowan has no great faith in Seavey's backgrounds; his own, he tells us, are, for the most part, painted for five shillings a-piece, by an old hand who has been a scene-painter in his day. Rather than the conventional drab-grey usually affected in backgrounds, a warm brown or brownish-grey is the tint preferred. The backgrounds are of various kinds;

Fig 2.



there is one with rollers top and bottom, an endless panorama; others moving in grooves, as if they were wings at a theatre; and a third description that is hinged, and acts like a practical door.

We were shown the properties wherewith all the rustic changes to be seen in Messrs. Hills and Saunders' cabinet pictures are carried out. Hay, dried grasses, dead palm leaves, together with a few growing plants in pots, and some branches and twigs, comprised the whole. "We throw nothing away," said our host, taking up a brown palm leaf from the floor; "we only take care to change the arrangement with every picture."

We have scarcely time to speak of the laboratory and dark-rooms. Gelatine plates are in constant requisition at Porchester Terrace, but so are wet plates. The ordinary dipping bath is not to be seen at all here; the sensitizing baths are of a horizontal character, swinging on pivots, of the same nature as those we described at the Autotype Company's works. The

interior is of paraffined wood, and they possess the advantage that less silver solution is needed, while the plates are permitted to drain more effectually.

"One guinea for the sitting, which must in all cases be paid at the time," is a notice we extract from the card of Messrs. Hills and Saunders, and for this guinea the sitter may take his choice of twelve cartes-de-visite, twelve vignettes, twelve medallions, six cabinets, or four boudoir pictures. Proofs are generally sent out the same evening, but always in an untuned and unmounted condition.

CAPTAIN ABNEY AT SOUTH KENSINGTON MUSEUM.

IN a remote corner of the vast establishment which has grown up of late years at South Kensington, among the workrooms and repairing lobbies, where works of art, statuary, models, pictures, &c., are set up, and generally put to rights, prior to their admission into the bright galleries of the Museum—behind the scenes, as it were, of the spectacular entertainment which is provided for the London public on such very cheap terms—is to be found one of the laboratories of Solar Physics. To come upon this laboratory, as we did, after traversing a quarter of a mile of brilliant glass cases and polished floor, of pleasant pictures, shining vases, and gorgeous war trophies that tempted one to linger at every step—to be ushered, we say, after this, into a sort of backstairs and lumber room department, was not agreeable. There was a cold, draughty, unfurnished look about the place, that caused you to wish yourself back again in the Museum itself; and it wanted all Captain Abney's warm reception and welcome to dispel these very unpleasant feelings.

To say that Captain Abney was busy photographing the red end of the spectrum, when we entered, need scarcely be set down; it is but a matter of course. We believe, in fact, that the region of the red is now universally admitted to be his own private domain; at any rate, there are very few physicists who would care to dispute the matter with him.

It is not so long ago, despite Sir John Herschell's dictum, that the photographing of the lines in the red end of the spectrum was regarded as an impossibility; but, thanks to our

advanced physicists, and particularly to Captain Abney, the ultra-red can now be recorded upon a photographic plate, if not as readily, at any rate as accurately, as the violet and ultra-violet portion of the spectrum.

His present investigations are confined to photographing light through various media, such as water, alcohol, glycerine, &c. Just now it is water, and he passes his light through a column of this medium no less than five feet in breadth. There is a long table; at one end shines an electric light, and the rays from this light are thrown by means of a condenser in a horizontal direction through a long tube, also placed horizontally, filled with water. At the end of this five-foot tube is the slit of the spectroscope, Captain Abney employing on the present occasion as many as five prisms to refract the rays; and at right angles to the spectroscope is the camera. We can see the red end of the spectrum limned in soft delicate colour here on the focussing screen, and remark how intense the ruddy glow is in the centre of the image; it is, of course, but an accident that Captain Abney's assistants should be attired in the same colour, but the scarlet-coated Sappers, as they move about with dark slide or lens, are all in harmony with the experiment.

There are two openings in the wall of the laboratory, which appear at first sight like tiny windows; they are condensers for the purpose of employing solar light; and looking out into the open, you see beyond, the pedestals whereupon stand the heliostats, which keep pace with the motion of the sun, or rather, of the earth, and permit a constant ray to be reflected into the laboratory through these condensers for hours together. In this way you may avail yourself very conveniently of the sun when it shines, and carry on solar work with a degree of comfort and convenience that experimenters do not always enjoy in pursuing their physical researches.

The dark-room of our photo-chemist is capable of all sorts of lighting. The collodion emulsion employed for photographing the red end of the spectrum appears to be more sensitive than the gelatine film, and very little light indeed is employed during its manipulation. So far as gelatine work is concerned, we may inform our readers that Captain Abney employs a gas jet with a glass globe, which globe is painted with a mixture of aurine and aniline scarlet applied by the aid of negative varnish. The aurine is an efficient substitute for yellow or orange, and the

aniline scarlet for ruby glass or fabric, a combination which, as most of us know, is very effective in cutting off troublesome rays from the gelatine film.

Captain Abney has taken a leaf out of Mr. England's book, in the preparation of gelatine plates, and possesses an efficient cupboard of the England pattern. He gives the England cupboard a very good character, and has no difficulty in maintaining a constant temperature of something like 75° Fahr., which dries the gelatine plates effectually.

After developing, and before fixing, our host makes it a practice to dip his gelatine plates into a saturated solution of alum; he prefers operating in this way rather than fixing the negative first of all. His development is carried out in white dishes of enamelled iron. They are somewhat after the shape of a Yorkshire pudding dish, and, besides being unbreakable, they have the advantage of showing when they are dirty and when they are clean.

Here is Captain Abney's method of preparing collodion emulsion sensitive to the infra-red region of the spectrum. He says:—"A normal collodion is first made according to the formula below:—

Pyroxyline (any ordinary kind)	...	16 grains
Ether ($\cdot 725$ s.p.)	... ..	4 ounces
Alcohol ($\cdot 820$)	... ..	2 ,,

"This is mixed some days before it is required for use, and any undissolved particles are allowed to settle, and the top portion is decanted off. 320 grains of pure zinc bromide are dissolved in $\frac{1}{2}$ ounce to 1 ounce of alcohol ($\cdot 820$) together with 1 drachm of nitric acid. This is added to 3 ounces of the above normal collodion, which is subsequently filtered. 500 grains of silver nitrate are next dissolved in the smallest quantity of hot distilled water, and 1 ounce of boiling alcohol $\cdot 820$ added. This solution is gradually poured into the bromised collodion, stirring briskly whilst the addition is being made. Silver bromide is now suspended in a fine state of division in the collodion, and if a drop of the fluid be examined by transmitted light, it will be found to be of an orange colour.

"Besides the suspended silver bromide, the collodion contains zinc nitrate, a little silver nitrate, and nitric acid, and these have to be eliminated. The collodion emulsion is turned out into a

glass flask, and the solvents carefully distilled over with the aid of a water bath, stopping the operation when the whole solids deposit at the bottom of the flask. Any liquid remaining is carefully drained off, and the flask filled with distilled water. After remaining a quarter-of-an-hour, the contents of the flask are poured into a well-washed linen bag, and the solids squeezed as dry as possible. The bag with the solids is again immersed in water, all lumps being crushed previously, and after half-an-hour the squeezing is repeated. This operation is continued till the wash water contains no trace of acid when tested by litmus paper. The squeezed solids are then immersed in alcohol .820 for half-an-hour to eliminate almost every trace of water, when, after wringing out as much of the alcohol as possible, the contents of the bag are transferred to a bottle, and 2 ounces of ether (.720) and 2 ounces of alcohol (.805) are added. This dissolves the pyroxyline, and leaves an emulsion of silver bromide, which, when viewed in a film, is essentially blue by transmitted light.

“All the operations must be conducted in very weak red light—such a light, for instance, as is thrown by a candle shaded by ruby glass at a distance of twenty feet. It is most important that the final washing should be conducted almost in darkness. It is also essential to eliminate all traces of nitric acid, as it retards the action of light on the bromide, and may destroy it if present in any appreciable quantities. To prepare the plate with this silver bromide emulsion, all that is necessary is to pour it over a clean glass plate, as in ordinary photographic processes, and to allow it to dry in a dark cupboard.

“For development of exposure I recommend what is known as the ferrous oxalate developer. This is prepared by dissolving ferrous oxalate in a saturated solution of neutral potassium oxalate, adding the iron salt till no more is taken up. To make up the developing solution, equal parts of this solution of ferrous oxalate, and of a solution of potassium bromide, 20 grains to the ounce, are employed. This mixture is placed in a clean developing glass just before development takes place. The film is first softened by flowing over it a mixture of equal parts of alcohol and water, and is then well washed. The developer is now poured over the plate, taking care to keep the fingers from touching any part of the film. The image will appear gradually, and should have fair density when all action is exhausted.

"The intensity can be materially increased by using the ordinary intensifying solutions of pyrogallic acid, citric acid, and silver nitrate. The unreduced silver bromide is removed by a saturated solution of sodium thiosulphite in water, from all traces of which the film should be thoroughly washed before being allowed to dry.

"The operation of development should take place in a very subdued red light, that recommended for the preparation of the emulsion being the safest. It is, however, somewhat remarkable that when the developing action has once been set up, a greater quantity of light may be permitted to fall on the plate than before the action commences. The bromide of potassium probably prevents any further action by the light, which may account for it. It should be noted that the image may be developed by the ordinary alkaline method, though not so satisfactorily, a slight veil being usually apparent.

"I may here state that by diminishing the amount of nitric acid to one-fourth the amount given in the preparation of the emulsion, it is possible in very cold weather to obtain plates which are sensitive to very low radiations, such as the radiations proceeding from boiling mercury, or even boiling water. In summer time this emulsion, as would naturally be expected, produces what are known as "foggy pictures;" but it can be rendered of use by flooding with hydrochloric acid. In the preparation of such an emulsion the water bath must be kept at a temperature but little above that of the boiling point of the ether."

MR. VALENTINE BLANCHARD IN REGENT STREET.

IN the neighbourhood of Fleet Street there have established themselves for several years past a body of gentlemen known by the name of the Whitefriars Club. This club is not a large one, and has never, we believe, since its commencement, numbered more than seventy or eighty members. It is for the most part a literary club—its predilection for the neighbourhood in question indicates as much—and amongst its past and present members may be cited men of considerable mark. Novelists, such as William Black and Charles Gibbon; editors of the great London dailies—to wit, Captain Hamber and Alfred Bate Richards; con-

ductors of humorous periodicals that enjoy scarcely less influence in the country, the late Tom Hood of *Fun*, and William Sawyer of *Funny Folks*; actors of the first rank, like Barry Sullivan and William Creswick; painters and cartoonists, such as Orchardson, R.A., and John Proctor; these, to cite a few examples, are upon the roll of Friars. But the Club, noted as it is for the long list of talented men enrolled under its name, is famous in one other respect: it possesses, beyond question, the finest gallery of photographic portraits to be found in any hall or room in London. Probably, the collection does not at this moment fall short of half-a-hundred, and the pictures are all of them of magnificent proportions, taken direct on 15 by 12 inch plates—vigorous, life-like, and characteristic. Moreover, they are all of them the work of Mr. V. Blanchard.

In a word, no better evidence of Mr. Blanchard's ability can be afforded than this fine collection of portraits at the Whitefriars Club. It shows, too, the school, or style, of portrait, for which Mr. Blanchard has achieved a very extensive reputation. His large direct portraits—massive, dignified, full of life—are, indeed, too well known to require any detailed description here, for every visitor to the Pall Mall Exhibitions during the past half-dozen years must have witnessed examples of his handiwork. Mr. Blanchard is, to some extent, a disciple of Adam-Salomon, the late well-known sculptor and photographer of Paris; but he has added to his portraits qualities which are personal to himself. The rich, luscious shadows of the Adam-Salomon school are present, together with other attributes inherent to Mr. Blanchard himself. We do not mean to say that the latter's portraits are better than those of his illustrious Paris *confrère*, but that, equally with Adam-Salomon's pictures, they have characteristics which mark them as the work of an artist in the foremost rank.

Mr. Blanchard's reception-room has but few pictures upon the walls, but they are well chosen examples of his best work. The most striking are "Rebecca at the Well," a fine Eastern study, which secured a medal at Pall Mall, and the picture of a Greek girl, that received a similar honour. In both of these pictures the management of the drapery is beyond praise; it falls in soft and graceful folds over the figure, without marring the outline of the latter. The Greek key pattern on the tunic of one of the models was pencilled by Mr. Blanchard himself, for he found that the addition of an edging or braiding to the drapery imparted a stiffness which was very objectionable to the picture. Miss

Furtado, as Esmeralda, is another study Mr. Blanchard may well feel proud of, and some manly portraits on 15 by 12 plates complete the collection. Mr. Blanchard's charge for these pictures is £4 4s. ; for cabinets, £2 2s. per dozen is asked, and for cartes, £1 1s.

The studio upstairs, at first sight, impresses one in a very singular manner. Instead of being light, it is dark. Indeed, there is little doubt that Mr. Blanchard employs less illumination than most of his brethren ; he objects to flood his models with light. Half-a-dozen movable screens are about the studio, standing some eight feet in height, and measuring six feet in breadth. These are put about with very little ceremony. "My light here is dead south," said Mr. Blanchard. "If I get bothered with the sun coming in, I simply stop the light from this portion of the studio, and go over there with my camera, where the light is easterly." And in a moment, our host had contrived by means of his screens a second studio at right angles to his first. "I consider," said Mr. Blanchard, "that the most perfect lighting a photographer can have is when the sun is obscured by a white cloud, and I endeavour to imitate this phenomenon in my studio. You see I have subdued illumination all on this side, and admit pure light only through two or three squares of glass."

Mr. Blanchard has an excellent plan for subduing his illumination. The side and roof, where it is of glass, and where the light is to be softened, are furnished with transparent screens of a movable character. In cloudy weather they are not needed ; in sunshine they are. These screens are covered with *papier minéral*, which has the appearance of fine ground glass ; the *papier minéral* has the advantage over ground glass of being far cheaper, and much lighter to handle. "English tracing paper won't do," says our host ; "it goes yellow after a few weeks, and then good-bye to your white cloud effect ; you get a yellow glare then, which is very unpleasant."

Mr. Blanchard has been working the powder process to good effect in producing pictures on opal. His formula is :—

Dextrine	...	...	...	...	4 drams
Grape sugar	...	...	...	...	4 "
Bichromate of potash	...	...	...	...	4 "
Glycerine	...	...	...	...	2 drops
Water	...	...	...	...	12 ounces

This is applied twice to the clean opal plate, carefully drying by heat in between; then, says Mr. Blanchard, the plate is ready for the printing operation. To make a print on the bichromate film, which should be even and bright, and of a deep yellow colour, a transparency, not a negative, is necessary. This transparency must be inverted, and, therefore, a print on glass by direct contact with the negative will not do. The transparency must be made in the copying camera, and care must be taken that the negative have the film side away from the lens. This transparency, in order to give the best result in the after-process of printing, should be very delicate and full of detail, but with clearness in the highest lights—in fact, bright as well as delicate—or the print will be dull and wanting in harmony. It is best to varnish the transparency for fear of accident, but it is not absolutely necessary. Now whilst the prepared opal is still warm (after the drying operation), lay it with film up on a board covered with dark velvet, and carefully place the transparency, which should also be warmed, with the film down on to the opal. Care must be taken to place it so that the head comes in the proper place on the opal. It must now be carried into the light, and exposed to clear *bright* light, not necessarily sunlight. Were this the same always, it would make the timing of the exposure much more simple. But it is impossible to indicate the exact exposure; this can only be found by experiment. After a little practice, it will be possible to judge by the amount of browning which takes place, for the bright yellow after a time gives place to a brown, not unlike ripe corn. From two to ten minutes in a dull light, or a few seconds in sunlight, will be found sufficient. When the plate is taken back to the dark-room, and the transparency removed, a faint image will be visible. The development is brought about by the employment of any finely-ground pigment, such as ivory-black or in indian red, in combination with black in suitable proportions to satisfy the taste of the operator.

Now apply the powder by the aid of a large camel-hair brush, beginning on a portion of the dress, or in the shadows of the hair, and not on the face. Should the powder attach itself too readily, and the camel-hair pencil appear to drag at all, the film is too tacky, and it will be better to shake off the powder and slightly warm the film before proceeding further. On the contrary, should the powder refuse to adhere after gently rubbing with the

pencil for some little time, shake off the powder and gently breathe upon the plate, and move it backwards and forwards until the moisture has evaporated, and again apply the powder as before. This operation may be repeated until the image is sufficiently brought up. If the exposure be too short, the powder will too readily attach itself, and the image will be muddy and wanting in contrast; whilst, on the other hand, if the exposure be too long, the image will be too much defined on the opal, and the powder will refuse to adhere even after a lengthened application. When, however, the exposure has been rightly timed, the powder will attach almost immediately, and a clear image will readily be developed. If, however, after varied exposures the powder refuses to adhere, it may be well to increase the proportion of the grape sugar in the solution, and the use of the separate solution of grape sugar mentioned above will be at once apparent.

The plate is now ready for fixing. This is accomplished by pouring over saturated solution of boracic acid in alcohol. After carefully drying, the plate must now be carefully soaked in a dish of clean water. After a few changes, to wash out the bichromate, the plate may be taken out and dried, and the picture is ready for the artist. If, on trying the plate with the finger, the powder be easily rubbed, the plate must be immersed for a few minutes in a bath composed of sulphuric acid two drams, water one pint. After a few changes of water the plate may be again dried.

Mr. Blanchard's copying camera for making his transparencies for the process is simple in the extreme. There is a long plank upon which the camera stands; at a little distance in front of the lens stands an upright board with a perforation in which the negative is placed. Beyond the negative, again, is a bit of white cardboard, or paper, sloping at an angle of 45° . The white paper reflects the light through the negative; and before focusing, a black cloth is simply thrown over the camera and over the upright board that carries the negative in order to shut out the light. This is the whole arrangement; there is no condenser, a No. 1 or No. 2B lens being employed for copying; and the apparatus has the inestimable advantage that it can be cleared out of the way in an instant, and rigged up again without delay, trouble, or expense.

AT THE WOOLWICH ARSENAL PHOTO-LITHOGRAPHIC ESTABLISHMENT—THE VELVET ROLLER.

HERE is the studio—a lofty glass-house—in which the negatives are secured, and running down the middle of it is a little tramway. The rails are some twenty inches apart, and upon them run the castors of a heavy oblong table; the table carries the camera, which is in this way advanced or retired without difficulty, a few simple wedges fixing the castors as soon as the necessary focus has been obtained. Under ordinary circumstances a spirit-level would be necessary to see if the camera is truly horizontal, and a plumb-line to ascertain if the drawing-board, upon which the plan to be copied is stretched, is quite perpendicular; but, with the assistance of suitable fixtures, such testing is no longer necessary. The camera-table, as it runs along the rails, is known to be properly adjusted, and the solid board fixed upright at right angles to the tramway is always in position. This upright board is covered with a sheet of white paper, in the middle of which is a tiny cross that marks the centre or axis of the lens.

Here is a drawing ready for copying; it is on tracing-paper, and we remark at once upon its greyish tint. "Is the ground white enough to give an opaque film?" we ask. "When it is backed with white cartridge paper it will be," is the reply; and having first provided it with this backing, the tracing-paper is fixed by means of drawing pins before the camera. The sheet measures three feet, and the photo-lithograph is to be twelve inches. There are fine lines and broad ones, dotted lines and delicate curves, but they seem to give no difficulty. The focus is taken midway between centre and margin of the picture, the lens, by-the-bye, being a rectilinear of twenty-six inches equivalent focus. It is a wet plate. A short exposure is given to get a delicate, thin image, and this, after fixing, is intensified by Dr. Eder's lead process, which consists in washing the negative scrupulously, and immersing it in a filtered solution of—

Distilled water	...	...	...	100 grammes
Red prussiate of potash	...	...	6	„
Nitrate of lead	...	...	4	„

The negative should be dipped into this bath as soon as it is fixed, and then but a few minutes are necessary for intensifying. If, however, the negative has become dry, then it should be put

to soak in water for some hours before it is put into the lead bath. Even in that case the process of intensifying takes a much longer time. For this reason it is better not to let the negative dry before it is intensified.

During the action of the lead bath, there is deposited upon the silver parts of the picture a faint yellowish-white precipitate, which makes the film appear quite white, and possesses an extraordinary amount of intensity. It is necessary to allow the negative to remain in the lead bath until it has assumed the same amount of density which you require in the end, for the next treatment with sulphide of ammonium is for the purpose rather of rendering the film permanent than to augment its density.

The action that goes on is similar to what takes place in the uranium intensifying process. The silver works as a reducing agent, and the red prussiate of potash passes into the yellow form, which then becomes an insoluble compound—ferrocyanide of lead—with the lead salts that are present. It is now necessary to convert the unstable lead compound into a permanent and, perhaps, more opaque compound, and this is done by the action of the sulphide of ammonium.

After the negative has been taken out of the lead bath, and well washed with distilled water, the sulphide of ammonium is applied. In washing, the colour of the film should become almost white; and if it is desired to know whether the washing process has been carried far enough, a few drops of the rinsings are allowed to fall into a little iron developer. If no blue colouring is to be observed, then the washing has been completely successful. The sulphide of ammonium is employed in the form of an aqueous solution of 20 per cent. strength, and immediately upon its application the image becomes perfectly black. The operator waits until the image is blackened right through, and then the sulphide of ammonium is washed off with ordinary water. In this way the most transparent lines may be secured upon a perfectly black ground. Distilled water should always be used for first washing the plate throughout these operations.

We are now taken in hand by Mr. Baker, the chief draughtsman of the establishment, under whose immediate charge the work of photo-lithography is conducted. "We have come to see the velvet-roller process," we tell Mr. Baker. "It is so

promising that it bids fair to oust the older process altogether," is his reply; and, in confirmation of his opinion, he exhibits a series of prints that have been pulled from the stone from a transfer just made.

The sensitizing-room is a small apartment with one large window, of which the lower half is darkened by a shutter, and the upper hung with tammy. Here the paper is sensitized. Only Bank Post is employed, a very tough and smooth material. "There are two kinds of Bank Post," says Mr. Baker; "one having parallel lines running across the sheet, and this is of no use whatever in the process." The paper is floated upon the bichromate and gelatine mixture* (one coating is usually sufficient, if it is skilfully done), and, when dry, exposed under the negative in the shade. Five minutes' printing is ample in the summer time, if the lines of the negative are pure and clear; but the time can only be well-judged by an experienced printer. When looked at in the dark-room, the faint brown marking of the image on the yellow paper is scarcely perceptible, and, for this reason, it is well to mark the face of the paper with a black-lead pencil immediately before sensitizing.

We have now before us a bichromated gelatine print, and we are going to treat it by the velvet-roller process. It is handled very much like carbon tissue that has just been printed. Mr. Baker throws it into cold water, and allows it to remain immersed for four or five minutes. He now takes a glass plate, rather shorter than the print, so that the ends may tuck under, and puts the impression carefully on the glass surface. The operations may henceforth be conducted in the light, for as soon as the print goes into cold water, you need be under no apprehension of spoiling it by daylight. The wet print is squeezed upon the glass plate, and the superfluous moisture further removed by lightly laying upon the surface a sheet of bibulous paper. "Let the print be too wet, rather than too dry," says our friend the chief draughtsman, as he carries it off to the lithographic room.

* Two solutions are made, and, for sensitizing, mixed together and kept warm; these are—

	Best gelatine	...	...	...	...	3 ounces
	Water	...	...	...	...	40 „
And						
	Bichromate of potash	...	...	...	...	2 ounces
	Water	...	...	...	...	10

Here some ordinary re-transfer ink has been considerably thinned with turpentine, and well rolled upon a slab with an ordinary leather roller. A burnished steel plate, close at hand, is now coated with a fine even surface of the dilute transfer ink by the application of the same roller, and then the velvet roller is taken in hand. This is passed over the steel plate to take up the ink, and then delicately rolled over the bichromate print. The ends of the print being double under the glass plate, it is kept flat and firm, and, to allow the lithographer sufficient play for his hands, the slab on which the glass plate rests is no larger than necessary for the purposes of support. At first the velvet roller is passed lightly over the surface, but some weight is afterwards borne upon it. "You see, I treat the silver print precisely as I would a stone," said the skilful lithographer, and he certainly did. The bichromate print was sponged and rubbed, and rolled and watered, just as if it were a lithographic stone, and, in a few minutes, the blank sheet of paper, which at first bore but the faintest of brown markings, was covered with fine black lines of the most exquisite sharpness—a design in miniature of the original drawing. Continued rolling up—carried out, be it remembered, by a skilled lithographer—brought more of the viscid black ink upon the lines, and in a quarter-of-an-hour—for very little cleaning was necessary—the plan was ready for transferring to stone. When wetting the paper is undesirable, breathing upon it will often impart sufficient moisture to the film to enable it to repel the ink from the roller. Before applying the finished transfer to a lithographic stone, it is well washed in cold water to remove the superfluous gelatine from the surface.

The velvet roller is of cotton velvet, light to handle, and, as the chief draughtsman remarks, "puddingy" in character. He prefers to employ two rollers in the working up, using them alternately, so that they may dry a little in between. Of course it is impossible to *scrape* the ink from a velvet roller. The best way to preserve the roller is to put it into a bag after use, without any further manipulation whatever; then, before beginning work again, free the roller from the old ink by rolling it on a clean slab, cleaning the slab at intervals with turpentine of the old ink. The velvet roller should always be cleaned in this way before using.

There is one more important point, and that is the mixing

of the transfer ink for application to the slab and to the roller. So that these instructions may be as practical as possible, we append here the directions of a practical photo-lithographer on the subject :—

Take 2 ounces of transfer ink from the pot, add $\frac{1}{4}$ -ounce of olive oil, mix well together with the muller on a slab; this, you will find, gives a paste about the consistency of butter. Such paste makes capital stock. When the printer is ready to roll up the transfer, reduce the above with turpentine to about the thickness of cream; you will now find your ink is ready for the roller. Charge the roller liberally, and roll the roller well up on the slab. In so doing, you will find the turpentine evaporate, leaving the ink in beautiful condition for a first-class transfer.

Should you find your ink get too stiff, reduce it with turpentine; be sure you roll your transfer one way only, namely, from you.

MR. ROBERT FAULKNER IN BAKER STREET.

THIS is the kingdom of Lilliput. From the walls look down upon you tiny forms and chubby faces; they smile or pout, are roguish or coy, bright or tearful, under the gentle sway of the silvery-bearded monarch who here reigns supreme. Like the pied piper of Hamelin, Mr. Faulkner can do as he pleases with his little people. It is not a question of obedience; it is an innate power he possesses, which renders them subservient to his will. We all of us have heard the German legend: how the pied piper was engaged by the village mayor to get rid of the rats, and having performed his task, got laughed at for his pains; how, in revenge, he went away playing upon his pipe so sweetly, that all the children, great and small, were perforce compelled to follow him; how he led them into a chasm in the mountain side, which closed upon the pigmy procession, so that the children were never seen again. Only one little fellow escaped—he was lame, and could not hobble along on his crutches so fast as the other children. He was shut out by the rock, and remained to tell the story. So, apparently, Mr. Faulkner has only to exercise his will to make his tiny subjects follow him. In his hands

they are not only plastic as clay, but smiles and tears, humour and pathos, are called up in the little faces at his bidding. Let boys and girls be ever so stubborn, Mr. Faulkner has but to breathe his spell, and they follow him. As Goethe has it:

“Und wären Knaben noch so trötzig,
Und wären Mädchen noch so stützig,
In meine Saiten greif ich ein,
Sie müssen alle hinter drein.”

It is not easy to get beyond the reception room. The merry dimples and winsome faces are for ever luring you to stay. Here is a little miss, in mob cap and loose gown, with curly locks and pensive look, who seems to have strayed out of a picture by Sir Joshua Reynolds. Here is a tiny being, her eyes as black as sloes, who has put up her bare arms behind her round head, and beams wickedly across to you. Here, a fair-haired urchin in the guise of a petty officer, looking every inch a sailor; and here again a study, of which Mr. Faulkner is justly proud, the “Infant Samuel,” whose upturned face is full of pathos and devotion.

Passing on, we enter a spacious gallery, in which are larger examples of Mr. Faulkner's work. Mr. Faulkner believes that a carte or cabinet negative is sufficiently large for most purposes, and his bigger pictures are all taken from these. Mr. Faulkner has a high opinion of powder pictures, but, unfortunately, he says, there is no one to whom the retouching of them can be trusted. A clumsy or ill-judged touch of the brush upon a delicate cheek or softly-moulded dimple will ruin the picture, and he now prefers to print his enlargements by the carbon process, confining the work of the retouching brush to simple “mending.” “There is not five shillings' worth of retouching work on any of these pictures,” said Mr. Faulkner, pointing to a fine series of studies, of which many have been published with marked success. A transparency is produced in the first place, and it is upon this transparency that depends the value of the finished work. Mr. Faulkner can bear out the adage, “If you want a thing done well, do it yourself,” since he is compelled to produce every one of his transparencies by his own hand. But he has the great consolation of knowing that he is successful. Of some of his studies printed in “red chalk” carbon, no less than 10,000 copies have been sold, for Mr. Faulkner appears just now to have the monopoly of producing sketches of this

nature, which are highly prized and eagerly purchased by painters and sculptors, as well as by the general public.

Mr. Faulkner speaks highly of gelatine plates for making reproductions, the soft, subdued character of the image yielded by a gelatino-bromide film being specially applicable to such work. For all his studio work, gelatine plates are also employed, and Mr. Faulkner's establishment is one of the few in which the silver bath has been wholly and completely got rid of.

We will walk upstairs into the glass room, for our readers are doubtless eager to learn all they can of Mr. Faulkner's method of treating his infant sitters. Our host courteously affords every information. How does he arrest their attention, call up that glow of intelligence in their faces, and give that vivid animation to their features? we ask; is it a matter of toys, or conjuring, or story-telling? "A ball is the best of all toys," replies our host; "this cow that gives real milk, often provokes wonder;" it is a toy treated Abyssinian fashion, a steak being removed from one of the flanks in order to permit the introduction of the milk in the first place; but one must rely a good deal upon one's sayings and doings."

The camera and stand must be described. The stand is of iron to give solidity, and upon it are placed, one above the other, two cameras of almost equal size. The ground glass of the upper camera can be seen without stooping, and hence the focussing is done with the greatest ease. A guard or screen, permanently fixed, throws the ground-glass into shadow, and there is no occasion, therefore, for a dark-cloth. The cameras are fixed together; hence one focussing arrangement does for both. The lower camera only receives a dark slide, the upper one is employed simply for focussing and watching the sitter; in a word, the upper camera acts as a "finder." Under these circumstances, as may be understood, the operations go on with smoothness and ease. There is no dark cloth, no pushing on one side the focussing screen to admit the entrance of a dark slide. There is a sensitive plate always ready in the lower camera, and no sooner has the model taken its seat than the operation may begin. The slide holds a plate large enough for four or six portraits, and if one of these is successful, Mr. Faulkner holds himself a happy man.

A movable pedestal, eighteen inches from the ground, serves as a platform whereon to pose the model. The sitter may thus

be presented to the camera under one aspect or the other, without being troubled to move at all, and the photographer standing behind the cameras watching his opportunity has every chance in his favour. Often the sitter, immediately it sits down, is at its best; while under ordinary circumstances, the model has to obey twice, namely, at the time of focussing and the time of exposure, and sometimes gets so fatigued over the former operation that it has lost all animation during the latter; Mr. Faulkner, by the assistance of his movable platform and double camera, is enabled quickly to seize any and every favourable opportunity that presents itself.

That Mr. Faulkner is an artist of a high order, and stamps his work with the imprint of his genius, is known to all who are familiar with his work, and obviously we cannot follow him very far, unless we too possess the same attributes. But we can all of us do our best, if we like, and a visit to Mr. Faulkner's establishment shows how much may be done in photography if one is gifted with taste and endowed with application. Mr. Faulkner's studio has little in it that is remarkable, but he employs, as we have seen, his means to the best of his ability. The lighting is of a very simple character. A skirting board rises five feet from the floor, and there is no top-light. The side where it is glazed is of large sheets of transparent glass; but this is used with the utmost moderation. Blinds are freely drawn near the camera, and in the vicinity of the sitter large squares of transparent paper may be made to cover the glass.

Mr. Faulkner has no other models than the little sitters who come to him in the course of business. The delightful studies in red chalk that he publishes in such large numbers are simply selections from his negatives. He pays, however, much attention to the dressing—or, rather, undressing—of his models. This little garment, we see, apparently of yellow silk, it is so soft and glossy, is but fashioned out of fine calico, the edges frayed, *not hemmed*, and dipped roughly into a little Judson's dye to give colour. Dressed in this simple tunic, no wonder the pink arms and legs of the model appear to such advantage, and that the drapery is rendered with such harmony and detail. But Mr. Faulkner has a grievance: he is dissatisfied with the printing processes of to-day for small work. Carbon printing, he avows, is not at the present moment sufficiently advanced for the printing of cartes, although it answers so admirably for larger pictures.

The only thing that can give us the full amount of delicacy and permanence, in Mr. Faulkner's opinion, is collodio-chloride paper. "I have an album downstairs, which I will show you, in which all the prints are fifteen years old; they are mounted on plate paper, and therefore should be the last to show traces of fading. But in that book there are only two pictures in which these traces cannot be recognised; the one is a Wothlytype, the other a collodio-chloride picture."

As to the delicacy furnished by albumen and collodio-chloride, there is no doubt as to the advantage being on the side of the latter. Before the prints go into the fixing bath, the albumenized paper prints will doubtless compare well enough with collodio-chloride, but the fixing bath removes fine gradations from the albumen surface; the collodio-chloride, on the other hand, is not attacked by the hyposulphite solution, and retains all the delicate gradations with which it has been impressed during the printing operation. But collodio-chloride paper cannot be purchased fresh and new in this country. "The Germans have makers of collodio-chloride paper in their midst; cannot we find a single manufacturer of photographic materials enterprising enough in this country to give us what we want?" asks Mr. Faulkner.



THE VAN DER WEYDE ELECTRIC STUDIO IN REGENT STREET.

THE lamps in Regent Street are lit, for the light fades early these short wintry days. It is still afternoon; the Quadrant is full of life; the gay costumes of the promenaders, now veiled in the mist of twilight, now made resplendent by the vivid illumination of the shops, lose none of their attraction, but, on the contrary, seem enhanced rather "between the dark and the daylight when the night is beginning to low'r." Longfellow is not alone in loving the period; we believe every thoroughbred Cockney rejoices in this time between the lights, and it is the one thing that reconciles him to winter when it comes upon us. There is a feeling of warmth, of cosiness, of brightness, of snugness prevailing at such times, which dwellers in great cities always delight in, and which may be considered a set-off against the many advantages our country cousins enjoy.

"I like to stroll down Regent Street," says the song, and between afternoon and evening the sentiment appears to be a very popular one. It is Cattle Show week, and this may have something to do with augmenting the busy crowd of loungers that hustle one another upon the glimmering pavement before the bright shops and under the glittering lamps. It may not be "the season" in town; but London is full, for all that, and so bustling and animated a scene is rarely found at any other time of the year.

It is hardly a seasonable hour to visit a photographic studio, one would think; but we have purposely delayed our call. The card of invitation says any hour before 7.30 p.m., so we are in plenty of time. Mr. Van der Weyde's studio is in a magnificent position in the very centre of Regent Street; and, of what Mr. Van der Weyde is very proud, it is under a slate roof. There is not even a sky-light, lest the suspicion should gain ground that sometimes daylight is employed for photographic purposes. The Van der Weyde establishment is a winter studio *par excellence*, it might be said, only that, curiously enough, it is in summer when most of the work is done, for the simple reason that the London season is during the longer months. What strikes one, indeed, in looking over the portraits here, is that so many persons should be represented in evening dress; but the mystery is solved by the explanation that the ladies and gentlemen in question have been photographed in the evening before they sat down to dinner, or maybe after they came home from the opera. It is but the other day we read of the Prince of Wales being photographed, after having first passed the evening at the play; while it is not so long ago that Mr. Van der Weyde had a call from Captain Shaw, of the Fire Brigade, accompanied by a certain duke whose fire-loving qualities are well-known, the visitors arriving at midnight, and not departing till one in the morning. Whether they came to see if the electric studio were on fire is a moot question, but certain it is they were not permitted to go till some very excellent portraits had been taken.

Mr. Van der Weyde's series of Royal pictures is a large one; but, fine as it is, the collection of "professional" portraits he has made is the most attractive. Perhaps ladies and gentlemen who are in the habit of appearing before the footlights make better pictures with artificial illumination. Here is a

portrait of Josef Gung'l, the composer; here is Toole, the comedian; here is Edwin Booth, and here is Henry Irving. All are clear, forcible, and brilliant—well lighted, and agreeably posed. Mr. Van der Weyde has discarded the dioptric or "lighthouse" lens he formerly employed, and of which a description was given some years ago. His electric light has a brilliancy equal to 6,000 candles, and is produced by a Gramme, or Siemens, machine, as may be found most convenient, for both systems find a place in the engine room. The engine is one of Otto's gas engines, Mr. Van der Weyde, we believe, having been the first to apply a gas engine to the evolution of electricity.

Mr. Van der Weyde, in explanation of his light, said:—"I had my gas-engine put up September, 1877, in direct opposition to the advice of the manufacturers of my electric machine. I never use an electric lamp, but, as you see, have invented a much more practical arrangement for my purpose. I simply bring my carbons together by a movement of the hand. The positive 20-millimetre carbon is stuck right through the saucer, and can be pushed in from time to time as it burns. The negative 15-millimetre carbon, fastened in a rod which passes through the back and centre of the reflector, is also adjustable. The saucer and positive carbon, being fixed to a flexible brass rod, can be made to approach the other carbon by simply pulling the cord attached, and which passes through the back of the reflector, and over a small drum. I first designed another position for the carbons, but on the same principle, but find this better, as the reflector gets the full benefit of the strongest rays."

We walk into one of the studios. The most prominent object is a large cup-shaped reflector, in the middle of which is the electric light. This reflector is five or six feet in diameter, like the half of a huge globe, the interior being of white paper; it hangs loosely from the ceiling, and is provided with a handle, so that an assistant, who holds it the while, can direct the light as he pleases. As a rule, it reflects the light downwards on the sitter at an angle of something like 45°. The electric glow of the carbon points is not seen by the sitter, because a little saucer, situated just below the spark, intervenes, throwing the light upwards into the parachute reflector, whence it is reflected upon the sitter. Mr. Van der Weyde does not cover in his electric light by means of a sheet of thin paper (giving it the form of a kettle-drum inverted), as do M. Liebert, of Paris,

and the Stereoscopic Company, but employs the full force of the light without subduing it by a medium. He is thus enabled to make very quick exposures. Cartes of children are secured in one or two seconds; while the cabinet portraits and promenade portraits, which are Mr. Van der Weyde's speciality, require but from six to seven seconds, gelatine plates being, of course, made use of.

The sitter is surrounded by white screens during the exposure, except, of course, on the side of the reflector; there is even a screen in front of the sitter, pushed, in the case of a vignette, within a foot or eighteen inches of the model, an opening in the latter screen permitting the camera to peep through. There cannot be a doubt that, under some circumstances, a front screen—such as this—especially if it had movable wings, or reflectors at sides, top, and bottom, might be advantageously employed for daylight portraits.

A young lady is ready posed as we enter. Mr. Van der Weyde himself arranges the model, and directs the lighting. One assistant, holding the reflector, obeys his directions, while a second focusses, and makes the camera ready. The portrait is to be a profile, illuminated by an edge light, and the reflector is so turned that the white screen at the back—which serves as background—is cast somewhat in the shadow. We peep through the camera opening, and the effect is delightful. The lady is young in years and comely in face, and, as she sits there, the pure electric light flooding face and shoulders, and brilliantly illuminating her features, we are reminded of the good fairy in the enchanted island of dazzling light, or the pretty princess of the realms of brightness, with whom we all become acquainted about Christmas time.

In practised hands the reflector permits of a wide range of lighting, and it is the effects thus obtained that have had much to do with the success of the Van der Weyde portraits. Again, instead of being hard, or black and white, the fault inherent, one would think, to artificial lighting, the pictures, by reason of the skilful lighting, are soft to a degree, and Mr. Van der Weyde tells us he has never to retouch a high-light.

A little incident of the studio may here be mentioned. The lady would like a second picture, without her bonnet. There is no need to get up and go away to arrange her hair or head-dress; an elegant little toilet table on castors, with mirror and brushes,

is pushed towards her chair, and, without moving, she can make her toilet as comfortably as in a boudoir. Not only is the lady not inconvenienced, but the photographer is not kept waiting. Mr. Van der Weyde always employs a loud-ticking metronome in the studio; as his source of light is pretty constant, if he accurately regulates the exposure, he is sure of securing negatives of equal density.

We mention the studio, but there are no studios in the ordinary sense of the term; the portraits are taken in two ordinary rooms, thickly carpeted and warmly furnished, and presenting little difference from sitting or drawing-room. The one is for groups, the other for single pictures; but, beyond the fact that in the former the reflector is rather bigger, the rooms are much alike. The dressing-rooms are well appointed, and in one of them was a large so-called Japanese mirror, a mirror such as many of our readers have seen, with folding wings, which, when opened at right angles to the front mirror, permit the fair observer to see even the back of her head, if she likes. A looking-glass like this is a more handsome piece of dressing-room furniture even than a cheval glass.

Mr. Van der Weyde charges for sittings, and not for portraits. A sitting for the promenade portrait, including eight copies, is charged three guineas; for "cabinet," including twelve copies, two guineas; or, if large heads are desired, then a guinea more is the fee. Cartes are one guinea a dozen.



THE PLATINOTYPE COMPANY AT BROMLEY ROAD.

A BAD negative, or an indifferent one, is best printed in silver; since you can see better what you are doing, you can control and dodge the better. For this reason, silver is, and will ever remain, a favourite process; but given a good negative, then platinotype may be used with advantage in a great many respects. It is true, that if you compare two prints from a fine negative, the one in platinum and the other in silver, the former, as a result, is still behind the latter, in the opinion of some photographers; but then comes in the balance of advantages. Although, as a photographic result, the silver print is to be preferred, the delicate warm grey tone of the platinum impression goes for much

with a large number of people, and with painters and artists in particular, who hold it in high favour by reason of its fine engraving-like aspect. Moreover, as much by reason of its tone as on account of the unglazed surface of the print, the platinotype is thoroughly well adapted for artistic colouring.

But the principal advantage of platinotype is its permanence. Mr. Spiller has made a searching investigation of the matter, and his opinion is that the print will last as long as the paper. His plan of testing the prints he thus describes:—

“Some of the prints were cut into sections and separately treated, so that the portions could afterwards be patched together again for comparison, when any loss of vigour or alteration of tone would become at once apparent.

“In this way I have tried the action of all the common acids, using these of such degrees of strength as seemed fair to the paper basis of the photographs. Thus, the nitric acid was diluted with an equal bulk of water, and sulphuric acid with three measures of water; but hydrochloric acid, having itself so little action upon paper, permitted of its being employed in the concentrated form. After an hour’s immersion not one of these acids exerted the slightest action upon the platinum prints, nor did weak caustic soda, sulphurous acid, hyposulphite of soda, strong ammonia, or cyanide of potassium. The last-named reagent draws a sharp line between a platinum print and an ordinary gold-toned photograph, showing a clear distinction in favour of platinum black as against reduced gold, and negating a direct assertion on this head by Dr. Van Monckhoven.

“With regard to chlorine, I found, much to my surprise, that a slip suspended within the neck of a flask from which chlorine gas was freely disengaged suffered no harm; nor even in another trial when, by accident, the print fell into the acid liquid from which the chlorine was being evolved. Further, I am prepared to say that nascent chlorine does not affect the platinotypes unless the conditions are very severe, or such as to bring about an actual disintegration of the paper, as by an attack of warm aqua-regia.”

But we must proceed to describe the process. Mr. Berkeley, who is one of the directors of the company, has some prints at hand that have just come from the frames, and these we examine in a subdued white light. “You know the process perfectly well, of course,” says Mr. Berkeley, “Of course, of course,”

is our reply, and then we hesitatingly add in effect, after the manner of the Bourgeois Gentilhomme, "*mais faites comme si je ne le savais pas.*"

Mr. Berkeley is good enough to accede to our wish. "This, you see, is a roll of paper as we receive it," he says. Since it is a roll some five feet broad and a yard or two thick, there is no difficulty about seeing it, and we at once say so. "Only Saxe paper is employed, and this comes direct from Steinbach," and then Mr. Berkeley proceeds to say how it is prepared for platinotype purposes.

After a preliminary sizing, a coating of ferric oxalate and platinous chloride is applied to the surface of the paper by means of a brush or pad, the work being done by girls, who are more light-handed than men. The platinum salt employed is that most easily reduced, and the paper is now sensitive to light and fit for issue. But platinotype has one arch-enemy, and that is damp. If you will only keep the paper dry, and all things that come in contact with it, your printing will be a success; but not otherwise. There is little difficulty about doing this, if you will follow the instructions of the Company; a tube or cylinder of tin is a handy utensil for storing paper or prints, the cylinder having at one end a receptacle for chloride of calcium, while as to keeping the paper dry in the printing frame, this is done by the simple precaution of putting a soft rubber pad or sheet over negative and paper.

The sensitiveness of platinotype paper is calculated to be about three times that of chloride of silver paper, but you cannot watch the progress of printing quite so well. The image is very faint, and it is not until the printer has had a little experience that he can judge accurately. The difficulty is one, however, easily surmounted, and, moreover, when it comes to the development of the print, you have the means at hand to correct over- and under-exposure.

To development Mr. Berkeley now proceeds:—A solution of oxalate of potash is heated in a flat dish to 170° or 180° F. If the prints are under-exposed (the first print of the batch is a good tell-tale), then the temperature is raised; if over-printed, the developer is used less warm. Mr. Hollyer—one of the masters of platinotype printing—sometimes employs the bath only tepid, taking half a minute to develop a print. But, as a rule, the picture is developed instantly. No sooner have you placed the

phantom brown image, face downwards, upon the warm solution than a bright vigorous picture starts into view—a dark grey print, forcible and strong, and yet possessed of that softness and delicacy which make platinotype so beloved by artists.

There is no toning, fixing, or even washing in the ordinary sense of the term. A water bath acidulated with a little hydrochloric acid receives the print, which, after a minute or two, is lifted into a second, and, may be, a third similar bath. The object is to discharge all the iron salt remaining in the paper, and as soon as the baths have no longer a yellow tint, the washing may be discontinued.

Of what is the finished image composed? it may be asked. Pure platinum, in the form that is known as spongy platinum, or, rather, platinum black; in a word, the finest state of division in which that metal occurs. Metallic platinum, as everybody knows, is one of the most stable of substances, and, therefore, there is little fear of any change taking place on account of contact with chemical substances that may come near the film. That is to say, the platinum is not likely to change; but since platinum black is known to chemists as possessing strong catalytic action (the power to induce decomposition in another body without itself undergoing perceptible alteration), any substance in contact with it might not share the same immunity. Stephenson's well-known rejoinder to the question what would happen if a cow got upon his new railway, "So much the worse for the coo," might well be paraphrased here, for, apparently, in the case of any chemical body coming near a platinum print, the resulting danger would be only to the body in question. For all this, however, no pigment has ever been found to change on application to a platinotype.

The developing liquid—oxalate of potash solution—is employed over and over again, and must not be thrown away, since it contains after use a good deal of platinum that may be recovered in the form of residue as easily as silver is from washings in the ordinary printing process. In the same way, trimmings and cuttings of the paper are valuable, and should not be thrown away. The prepared paper has a yellowish tint, and for this reason the laboratory or printing-room should not be illuminated by yellow glass; a feeble white light is far preferable.

As most of our readers know very well, vignetting and fancy

printing is as easily conducted with platinotype as with the chloride of silver process, the results, in every case, possessing the cold grey tone inseparable to platinum. This tone, however, much as the absence of much warmth may be regretted, is at a premium with book-publishers, by reason of its harmony with letter-press and engravings. Silver prints never harmonise well with type, but platinotype does so very perfectly.

Mr. Berkeley was good enough to show us some examples of platinotype enlarging, sent over from New York by Mr. Willis, to whom we all know the elaboration of the process is due; these enlargements were secured from small negatives by the aid of electric light, and were exceedingly satisfactory, both in respect to vigour and detail.

MR. ALEXANDER BASSANO AT OLD BOND STREET.

MR. BASSANO's gallery in Old Bond Street at once impresses you with this idea: it is exactly the sort of studio we should all of us like to have. A handsome suite of rooms on the first floor in a fashionable thoroughfare, a *clientele* that troubles you only in the season, and sitters who do not object to pay well for the attention they receive. Listen to this, good friends, who believe that photographic portraiture is no longer worthily recompensed. "Mr. Bassano's terms are: Two guineas for the sitting, which sum entitles the sitter to either twelve cabinets or twenty carte-de-visite photographs." This we take from Mr. Bassano's card; and another little bit of pasteboard in our possession, "Appointment for sitting," says: "Should it not be convenient to keep the above appointment, notice must be given to that effect by return of post, otherwise the fee for the sitting will be charged; or the appointment card may be transferred to a friend at the option of the intending sitter."

The reception rooms in Bond Street are a series of well-appointed drawing rooms in which sitters and callers may lounge at leisure. Everything here is quiet and subdued, and if any fault can be found, it is rather that the elegant furniture and soft carpets are a little too quiet. Some magnificent carbon enlargements adorn the walls, rather larger than life-size, we should say, for they are mostly three-quarter portraits, and taken

on plates 48 by 36. "People are beginning to find out that silver pictures are not permanent," said Mr. Bassano, "and every day carbon pictures are making headway." A magnificent picture of the Duke of Connaught, and another—this one especially fine—of the Duchesse de Marino, may be mentioned as master-pieces, while, almost as a matter of course, there are oil paintings and crayons to be seen, all executed upon a photographic basis. In one corner of the room are three busts—the Duke of Connaught, the Prince Imperial, and John Evelyn, of Wooton, a lineal descendant of him of the Diary, all the personal work of Mr. Bassano, for, like his late Parisian *confrère*, Adam-Salomon, our host is a sculptor of some note. But a few minutes before our visit, indeed, the Duchess of Connaught had paid a private call to see her royal husband in plaster.

Mr. Bassano is introducing a new portrait which he terms the Holbein, and which he considers is calculated to show both a full and half-length portrait to advantage; the size is $7\frac{1}{2}$ by 5 inches, and the proportions are certainly very handsome. Photography cannot idealise, but should be "nature apprehended in its most intellectual phase," is Mr. Bassano's view; and there will be but few who do not agree with him. Nothing idealistic ought to be attempted, since the photographer is sure to fail; his province is rather to make a graceful and happy portrait, and with this he should fain be content. A stout scrap-book of large dimensions, such as would not suffer if handled a bit roughly, stands convenient to visitors, and here they can at once see how far Mr. Bassano is true to his principles. It contains a whole series of Zulu heroes: Sir Thomas Pearson, a bluff British colonel; Redvers Buller, V.C., longheaded and intellectual; Chard, of Rork's Drift, the beau ideal of a dashing young officer, &c., &c. A stout scrap-book of this kind is, our readers might note, an interesting item in the reception room.

There is a charming Rembrandt portrait of Mrs. Langtry, a bold picture of H.R.H. the Field Marshal Commanding in Chief, and of other illustrious personages worthy of note. But we must go upstairs to the studio. We leave the comfortable reception room—having first signalled our coming above at one of a series of ivory whistles, which plainly betoken system and order—and ascend a broad staircase. We peep into the dressing rooms on our way—all of them apartments of considerable dimensions, for ladies, if in court dress, like plenty of room for their trains and

feathers—and then mount once more. There are two studios, lighted from the same direction, N.E. and S.E., so that both ends of the studios may be made use of. In the principal studio—26 feet in length—there was but one background. But it was a long one. It measured no less than 80 feet, and was mounted on perpendicular rollers like a panorama. Its handiness was obvious. As it was deftly passed in review, the tint changed from warm to cold, the scene from outdoor to indoor, and, in a word, progressed through every phase. Mr. Bassano permits the sitter to be in his studio half-an-hour, and as several pictures are taken, this period he holds to be quite brief enough. It is another matter with a vignette, where, perhaps, but a turn of the head is necessary to alter the pose; but with full or three-quarter length portraits, much time is necessary. Moreover, he believes that the trouble taken is not thrown away, for if you please a sitter, he generally holds to the same portrait year after year, and asks for it to be printed in this style or that, rather than go to the trouble of a fresh sitting. The cameras, by the way, are provided with a square hood or funnel of black, projecting twelve inches beyond the lens, to shade this from the light.

Another point that struck us in the studio was the presence of nought but real furniture. The tables, chairs, and bookcases were real, the piano was real, the Persian carpet was real. The illumination was a high side light, the skirting board coming up about two feet six inches from the floor, and the curtains of blue linen were so arranged that by the lower ones being permitted to rise and the upper ones to fall, you could light the sitter by a central illumination, which central illumination could be high or low as occasion required. Mr. Bassano permits the sitter to be accompanied by his or her friends into the studio; he makes no restriction; they may do as they please. There is a portion partitioned off by curtains where friends may sit, and whence issue the dark rooms.

Of course Mr. Bassano is fully alive to the advantages of gelatine plates, and considers they were sent as a sort of providence during our heavy fogs. But the gelatine films are difficult to retouch upon. Mr. Bassano's work requires a staff of three artists to be constantly engaged on the work of retouching negatives. The ordinary retouching frames are used, and a sharply-pointed pencil, either Wolff's or Faber's. But a B or

HB won't do upon a gelatine film. A four H pencil was being employed by one artist, and on our enquiring of another if he were using the same, he replied, "No, I am employing a five H point." To give tooth to the film, a little turpentine rubbed on with the finger is found to be most efficacious. The quality of the gelatine negative was exceptionally fine, the film as smooth and harmonious as that of the best wet collodion plate.

Mr. Bassano reserves his Bond Street establishment for photographs taken by appointment, while a second gallery in Piccadilly takes the impromptu work. In Piccadilly there is little else but top light available, but since the pictures taken there have made Mr. Bassano's reputation, we may assume that something besides light is necessary for successful portraiture.



DR. HUGGINS AT UPPER TULSE HILL.

"HERE are my star photographs," said Dr. Huggins. A small drawer is before us filled with neat little leather boxes, that might be jewel cases, only that their contents are more precious than jewels. For truly no labourer in the diamond fields ever worked harder than Dr. Huggins has done to secure these tiny gems. Here is a tray of them! Each represents a glinting star from our lustrous firmament. This one is Sirius, or the Dog Star; this is Vega; this, one of the glittering constellation known as the Great Bear; another is Arcturus; yet another Capella; and this last, the yellow star Aldebaran. Were they but rubies and sapphires, a lucky search would have secured them in a month; as it is, they represent the labours of a lifetime.

They are minute photographic negatives, as we see clearly enough now we are permitted to take one in our hands and examine it under a magnifier. The image is half an inch long, and about an eighth of an inch broad, a little white band with zebra stripes—or more, perhaps, like a bit of bamboo straw with well-marked joints. The stripes are not all of the same thickness, nor are they always at equal distances, and it is to this circumstance particularly that our host calls attention, for on the presence or absence of these lines the whole teaching of Dr.

Huggins' wonderful discoveries in connection with the star world depends.

But we must go back a little to explain Dr. Huggins' research clearly. For instance, they teach us, as we shall presently see, how it is possible to classify the stars; how some are very much like our sun—which is simply a star, and nothing else, and only appears larger because it is not so many millions of miles off, as the rest of them—and how some are glowing masses of matter only just beginning to burn, while other have been alight so long that they are nearly burnt out. These old, worn-out stars—or suns, if you like to call them so—will in all probability soon become but a mass of cinder or pumice-stone, such as our moon now is, which, as everybody knows, gives forth no light itself, and only shines when it reflects back the sunlight thrown upon it.

The pictures before us are not simply photographs of the stars, but photographs of the spectra of the stars. And, here, please, one word before embarking on our explanation. Lest the reader take fright at the word spectrum, or spectra, we want to say at the outset that we are not going to use any scientific terms whatever, or allude to any abstruse matters. We are going to give as unscientific an account of Dr. Huggins' investigation as we possibly can; that is our only object, and we shall be but too pleased if we err on the side of puerility.

We say Dr. Huggins photographs the spectrum of a star, and not the star itself, and this is easily explained. Everybody who has entered a room in which a chandelier with glass drops happens to be, or lustres on the mantelpiece, knows very well that the colours of the rainbow frequently hover about them. The reason of this, too, most people know. A ray of sunlight, or daylight, however white and shining it appears under ordinary circumstances, is made up of a bundle or faggot of coloured rays, and the coloured rays are seen whenever the faggot gets dispersed. Many things will cause the dispersion of light, and turn a white ray into a broad coloured band, or ribbon of red, yellow, blue, and violet. Out of doors the rain often does it for us, and then we get the rainbow; but indoors the dispersion of light is generally due to the triangular or prism-like drops of our chandeliers and lustres. Whenever you put a prism of glass in the path of a beam of sun-light, you get this dispersion or separation of the faggot; and this dispersion is called the spec-

trum. If it be a beam of sunlight that is dispersed into colours, we call the band of colours the spectrum of the sun or solar spectrum; if we look at the light from one of the stars, putting first of all a prism in the way between our eye and the star to disperse the ray, then the colours shown we term the spectrum of a star.

“But what amount of light can possibly come from a star?” the reader will exclaim. “Surely the twinkling spots we see in the heavens are not sufficient for dispersion, and for the formation of a coloured rainbow or spectrum?” We answer, not only is the light of our stars sufficient to give a tiny rainbow—by making it go through a prism—but this tiny rainbow or star spectrum can be photographed, thanks to rapid gelatine plates, and it is just this wonderful feat which Dr. Huggins has accomplished.

Of course, in his tiny pictures, we see no colour; this has yet to come. But we see something that is more important even than colour. We have spoken of star spectra, and of the spectrum given by the sun, and we may mention that most bodies that emit rays are capable of furnishing a spectrum. A red hot poker, for instance, will give you a spectrum, and so will a glowing coal. But if you want to see the colours to perfection, as they come from the prism, you must look at them in the dark; just as in camera work you can see best to focus when extraneous light is cut off. Thus, if you darken the room in which your prism is, and only let in a beam of sunshine through a chink in the shutter, your colours, or spectrum, or rainbow, whatever you choose to call it, will be very vivid. You see the white ray coming sharp and straight from the shutter to the prism, and then dispersed into a spectrum. The more narrow your chink or slit, the clearer will be your spectrum, and when you have narrowed the slit to something like $\frac{1}{350}$ of an inch, you will find in the spectrum something more than a row of mere colours. You will see a lot of little upright lines, which you have not seen before; and it is these lines, particularly, their place in the spectrum, their number, and their thickness, which is of importance. They are a language, which we cannot as yet read distinctly, but which, little by little, we are beginning to understand. Already these lines in the spectrum have told us much of which before we knew nothing; what they will reveal in the future, the future alone can tell.

Dr. Huggins, then, photographs the spectrum of a star ; that is, he does not present his camera directly at the heavens ; before the light of the star is allowed to shine upon his sensitive plate, it is compelled to pass through a prism to be dispersed, and it is this dispersed light—this band of colours—this spectrum—of which he gets an image. And he gets not only an image of the spectrum, or rainbow, but of the little upright lines in the spectrum, too. As we said before, his negative pictures are little white bands with “zebra stripes,” these stripes, more or less vivid, being no other than the lines in the spectrum.

Now, what do these lines mean ? They have reference to certain metals or substances. Thus, if we take a spoonful of common salt—or chloride of sodium, as chemists call it—and burn it in a flame, and then examine that flame, we shall find in the spectrum that it casts an upright line of a vivid yellow. This line appears in the red part of the rainbow, or spectrum, and whenever sodium is present in a flame, no matter how minute the quantity, this line always makes its appearance, and always in precisely the same position of the spectrum. We can only argue one thing from this ; that there is sodium present whenever we see the line. Hence it is called the sodium line. Mr. William Crookes, the first editor of the *PHOTOGRAPHIC NEWS*, one day burning some sulphur, and looking at the spectrum of the flame, discovered, to his surprise, a line he had never seen before. It was a single green line, and hence he knew there must be something present in the flame of which chemists at that moment knew nothing. He proceeded with his investigation, and, in a few days, was able to announce to the world that he had discovered, through the medium of the spectrum, an entirely new metal, to which he gave the name of Thallium.

Since, then, the lines tell us of the presence of certain bodies we have in the spectrum, we have here a very easy and simple way of finding out what is in a substance that is burning. We can tell if it contain copper, iron, sodium, &c. The lines proclaim the fact at once. It is, in a word, a most efficient and quick method of analysis, this method of spectrum analysis. A ray of sunshine, falling on a prism, and dispersing, exhibits lines that leave little doubt that in the glowing mass we call the sun there is sodium, iron, hydrogen in vast quantities, &c. Dr. Huggins, in like manner, has examined the light from various stars, and, from the lines he has obtained, he tells us how, in the

bright star Sirius, there is sodium, magnesium, hydrogen, and iron, and in the yellow star Aldebaran these are to be found in conjunction with bismuth, antimony, and mercury.

Now we come to the important task which photography has fulfilled in connection with this wonderful investigation. We have hitherto spoken of lines visible to the eye. But, at one edge of the rainbow, or spectrum, in the violet and lavender regions, there are lines which are invisible to the eye, but which can, nevertheless, be photographed. Dr. Huggins, indeed, does not care to photograph more than half the spectrum; the red and yellow parts he can best examine with the eye, and therefore he confines himself to photographing the lines in the violet and lavender regions, and in the region beyond, which, curiously enough, we cannot see at all. And it is precisely these regions that appear to be most interesting so far as the stars are concerned. His little photographs show at once that there are, at any rate, three distinct classes of stars. There are those, for instance, which give twelve distinct lines, or zebra stripes. These lines are evidently due to hydrogen, and denote vast masses of this inflammable gas to be present in the stars. All white stars give these twelve lines, such as Sirius, Vega, the Great Bear, &c., and for this reason it is presumed that they are youthful stars. Next, there are stars that give lines, or spectra, so much like the lines given by our own sun, that they are doubtless of the same age, and have been burning about as long; Capella is one of these, which, among other things, do not show the hydrogen lines so perfectly. Finally, we have old suns, like Arcturus, and the yellow star Aldebaran, which seem to be rapidly burning themselves out; the spectrum here is very different, the twelve hydrogen lines, as an instance, being reduced to six.

Dr. Huggins invites us into his observatory, and we climb the stairs in his company. We make our way through a well-appointed laboratory, then ascend into an apparatus room, full of magnificent electrical paraphernalia and optical appliances, and finally, pushing open a trap above our heads, reach the "star chamber." It is not very high up, after all, where Dr. Huggins holds communion with the stars. Yet we may here see farther into the heavens than from the loftiest spire upon earth.

In the centre is a vast telescope, some twelve feet long and twenty inches in diameter; it is inclined upwards through an orifice in the roof, the roof itself being dome-shaped, and capable

of revolution, so that the whole hemisphere of the heavens may in turn be examined.

It is here that the work to which we have alluded has been performed—work which may seem simple enough to the reader, but which has involved the exercise of patience and perseverance indescribable. Who shall tell of the countless watchings, the indomitable fortitude, the persistent activity by which the triumph has been gained? Fortunately, our worthy host has a worthy assistant in the person of Mrs. Huggins, to whom is due, in no small measure, the success of his labours. Our readers know full well how feeble is the light of a star; and when they bear in mind that only as much of that light as can come through a slit $\frac{1}{350}$ of an inch is permitted to act on the photographic plate, this light being not in the form of a pin's point, but spread over half an inch surface, they will understand that a long exposure is necessary. Sometimes, indeed, two hours are required to impress the image, and during the whole of this weary interval it is the duty of the doctor's chief assistant to watch that star, and see that it remains in its proper place upon the slit of the instrument. The stars, as we all know, are constantly moving—or, rather, the earth is, which is the same thing—and the consequence is that the big telescope, in which the camera and spectrum apparatus are placed, has to be kept moving, too, by clockwork, to keep up with the star. But, delicately-regulated as the clockwork is, it cannot always be depended upon to move the telescope exactly at the same rate as the earth. For this reason it is that Mrs. Huggins duly watches to see it do its duty, the lady having appliances at hand whereby she can amend the speed, and catch the star again by going a little faster, or slower, as the case may be.

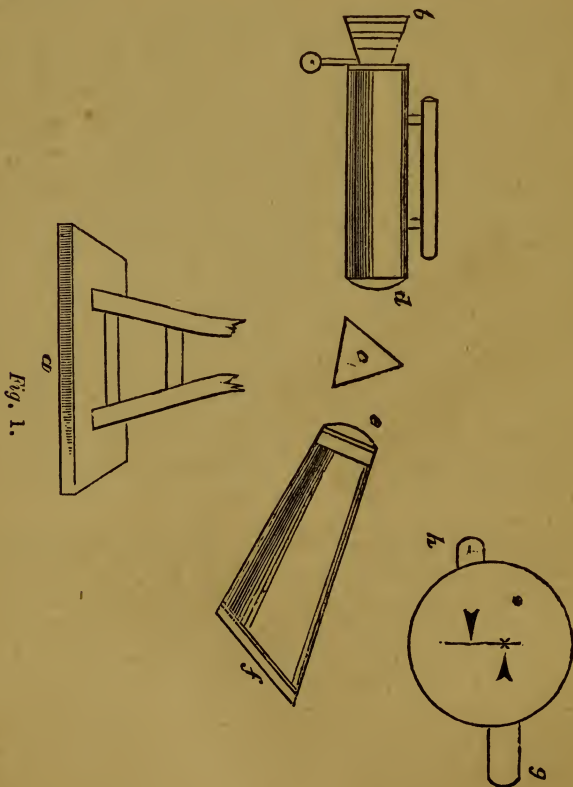
Mrs. Huggins is also an accomplished photographer, and is conversant with all the advances recently made. Indeed, it is only, as one can well understand, with the aid of very sensitive gelatine plates that some of the stars—the red ones and the yellow ones particularly—can be made to tell their interesting story. “It is all very well to speak lightly of doubling the exposure,” said Dr. Huggins, “when it is a question of seconds only; but, in my case, it is a matter of hours.” Dr. Huggins, in his work, soon gets to know of a plate's sensitiveness; making long exposures during the weary watches of the night is a crucial test for the sensitive film.

And now, if the reader will but listen another moment, we can, in a very few words, explain how Dr. Huggins does his photographic work. We have said that the little camera and spectrum apparatus are inside the telescope, and we have explained how it is necessary, in order to get a proper image upon the sensitive plate, that the light from the star should shine into the apparatus through a tiny slit not more than $\frac{1}{350}$ of an inch broad. The great thing to be accomplished, therefore, is to get the little luminary to settle exactly upon this slit, and to keep it there during the long time necessary for the exposure. It is done in this way. The telescope, which is nothing more than a hollow tube, is directed towards the heavens, and in such a way that the star shines down the tube. There are many stars, of course, but Dr. Huggins has only to do with one at a time. At the bottom of the tube or telescope is a mirror, and the consequence is that the star, looking down the tube, shines upon the mirror. The mirror, then, by careful handling, is made to reflect the particular star upon the slit of the camera apparatus, and very nicely indeed has the mirror to be adjusted to do this. But this difficult task it fulfils, nevertheless, under the skilful hands of Mrs. Huggins, and to that lady, as we have said, falls the onerous duty of continually watching to see that the tiny spot of light keeps hovering over the slit. Of course the big telescope is moving all the while, and the camera inside as well, by means of the clockwork, to which we have referred, in order to keep up with the moving star; but let the mechanism be ever so well-regulated, it requires unremitting attention, so that, as we have said, the eye has continually to watch the position of the star upon the apparatus the whole weary time of the exposure.

It is only on certain nights in the year that star photography is at all possible. You must be for ever on the alert, watching your opportunity. The night must not only be clear, but steady. After rain the stars are sometimes very bright, and they do not twinkle, a sure sign of atmospherical disturbance. Here is the tiny camera fixed at the end of the spectrum apparatus, and here the little dark slide that receives the plate; it is half-an-inch broad and two inches long—surely, the smallest dark slide in the world! Autumn and spring Dr. Huggins prefers for his photographic work, and, if possible, he brings his labours to an end at midnight. In wintry weather he can commence work about

six ; but in the summer time he has sometimes to wait till ten before the stars are bright enough for his purpose.

Dr. Huggins, in describing his apparatus, says : It was necessary to devise an apparatus which should produce on the plate a well-defined spectrum, full of fine details, with the least possible loss of light. As glass is but imperfectly transparent to light beyond the visible spectrum, it was necessary to avoid the use of this substance. The telescope was a reflector of the Cassegrain form, having a metallic speculum eighteen inches diameter. The form of spectrum apparatus is represented in the accompanying wood-cut :—



a is a base-plate with bevelled edges, which slides with a suit-

ably grooved plate fixed at the end of a telescope. *b* is the slit, having a width of $\frac{1}{350}$ th part of an inch; *c* is the prism of Iceland spar, a substance very transparent to the ultra-violet rays, and possessing a power of dispersion equal to moderately dense flint. The lenses, *d* and *e*, are of quartz. The plate is placed at *f*, and inclined so as to bring as large a part as possible of the spectrum to focus upon it. The photographic spectra taken with this apparatus measure half an inch from *g* to *d*, and the definition is so excellent, that seven lines may be seen between H and K in the solar spectrum.

The difficulty arising from the star's apparent motion required a special arrangement to enable the star's image to be brought upon and kept accurately within the very narrow chink, the $\frac{1}{350}$ th of an inch wide, through which the light must pass.

In addition to a massive equatorial mounting, and a driving clock of great excellence, due to the inventive skill of Mr. Howard Grubb, the arrangement shown in fig. 2 was adopted.

Fig. 2 shows parts of the telescope. The spectrum apparatus.

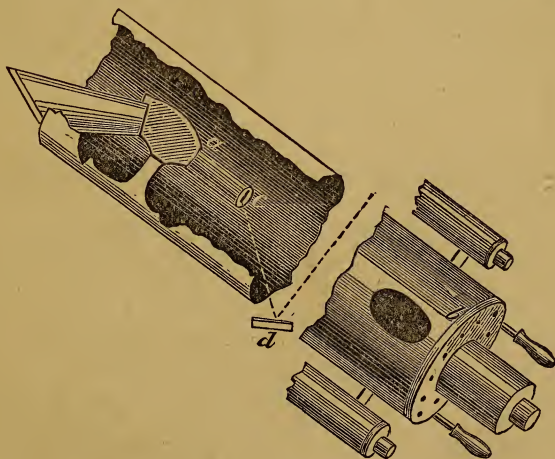


Fig. 2.

a is fixed so that the slit may be exactly at the principal focus of the mirror *b*. Over the slit is placed a polished silver plate, *c*, with an opening corresponding to the slit. By means of a small mirror, *d*, artificial yellow light is thrown upon this plate.

Behind the hole in the centre of the speculum is placed a small Galilean telescope or opera-glass. If the telescope is directed to a star, and the observer looks into this small telescope, he sees the silver plate and the slit within the opening by means of the artificial light. He sees also upon the plate the image of the star as a bright point. It is then within his power to bring this bright point exactly upon any desired part of the slit, and by continuously watching it during the whole time of photographic exposure, which may be an hour or more, to correct instantly, by hand, any small irregularities of the motion of the telescope.

It was necessary, further, to have the means of being able, from comparison with a known spectrum, to determine the wave lengths of the lines in the spectra of the stars. For this purpose the slit was provided with two shutters, *g* and *h* (fig. 1). During the exposure the shutter *g* only was open; when the photograph had been taken this shutter was closed, and the second shutter, *h*, withdrawn: through this half of the slit a second spectrum was taken upon the same plate. This might be the sun's light reflected from the moon, or the spectrum of a known star, or a terrestrial spectrum, or direct sunlight on the following day.



MESSRS. WINDOW & GROVE AT BAKER STREET.

THE establishment of Messrs. Window and Grove is, in some sort, historical. If not the first, the late Mr. Window was one of the first to settle in that fashionable quarter, constituting the loadstone towards which so many have since gravitated. Why photography and Baker Street should have become synonymous terms is not very clear; but we suppose fashionable loungers are naturally attracted towards Baker Street Bazaar, and fashionable photographers have come after them. But the Window and Grove establishment has other claims upon history. The cabinet portrait was born here. Mr. Window was the first to suggest and press upon the attention of the public this familiar style, which has not only become popular in this country, but as the "carte album" is in favour throughout the Continent and in America. We ourselves remember seeing years ago, in one of the first studios of Vienna, half a-dozen cabinets from the Baker

Street studio, which had been sent for to serve as models, while woodcuts appeared in the foreign journals of Mr. Window's work, to show size, proportion, and style of the new portrait. Again, the cameo portrait—four heads taken from different points, and embossed upon a card, in the form of a diamond—was due to Mr. Window, a *format* that enjoyed a good deal of popularity, and deserved yet more; while it was here, in this studio at Baker Street, that the first essay at printing portraits in carbon was made by a private firm.

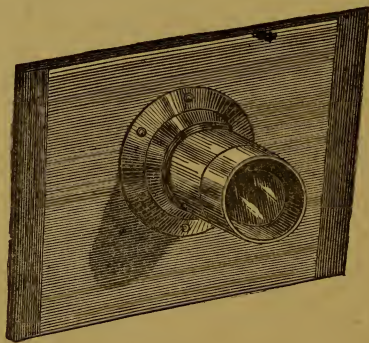
It is not surprising that an establishment which has had so much to do with the cabinet portrait should still look with favour upon a child of its own. Mr. Grove, who is good enough to receive us, and to act as guide through the establishment, tells us the demand made for cabinet pictures is still so brisk, that no endeavour has been made to introduce the panel picture, which, in many studios, has long been fashionable. A vignetted bust is the favourite portrait, the delicate tinted ground being secured, as we presently see, by means of fawn-coloured cloth, stretched without a fold to serve as background. Carbon upon opal—the red chalk carbon—is also a speciality of Messrs. Window and Grove, the pictures measuring from fifteen to twenty inches, being produced from enlargements of the original cabinet negative. In a word, the establishment is working, and to some purpose, too, upon the lines it adopted a dozen years ago.

The light is not very good, for it is a dull February day, and Mr. Grove, who has been using gelatine plates of two of the best known firms, tells us that cartes have required an exposure of from eight to ten seconds, and cabinets from sixteen to twenty. It is Mr. Grove's practice to take two views of each pose, giving the one, two, or three seconds' more exposure than the other, and, in this way, he can rely pretty well upon his gelatine films.

"You are using, then, nothing but gelatine?" we say. "To-day I am, and throughout the winter I have done so; but I shall get back to wet collodion when I can." Mr. Grove fully appreciates the value of gelatine; it enables him to take pictures and guineas at the same time, which otherwise would be lost to him; but were both mediums equally open to employment, he would unhesitatingly prefer a wet plate. It might be difficult, possibly, to specify the particular point of advantage—whether it lies in being able better to control the development, or in securing deeper and more harmonious effects; but that the wet

plate, when there is light enough, has an undoubted advantage—for the present, at any rate—Mr. Grove fully believes. It is in the print, according to Mr. Grove, rather than in the negative, that the weakness of a gelatine film is to be seen, and a practised eye should have no difficulty in pronouncing any print the result of a wet or dry plate.

Mr. Grove invariably employs the oxalate developer, for one reason because many of his negatives have afterwards to be enlarged for carbon work, and it is impossible to get a good enlargement with any negative showing a trace of pyrogallie staining. We are invited into the enlarging-room. It is of the simplest kind: an empty room lighted by a single window, looking on to a small yard. By craning your neck out of window, you might get a glimpse of the sky above, but not otherwise. Yet Mr. Grove makes good use of the parallel rays that fall into this well of a place. The window can be shuttered at a moment's notice, with the exception of a single pane, in which a bellows camera has been fitted. The transparency is fitted in the camera, and



the light reflected upon it by a large sheet of opal glass, twenty-four inches square, that is outside the window fixed to a board that slopes at an angle of 45° with the casement. The enlarged image thus thrown into the room is received upon an upright screen, which either bears a focussing glass or carrier with plate. The focussing or enlarging is easily done by approaching or receding the screen. This latter is a sturdy frame-work of wood, standing five or six feet high, the bottom being fixed in a four-wheel cart or trolley, which moves on a tramway laid across the room. The

wheels are small, and as the whole structure is rather heavy, it only moves slowly when pushed, and does not, indeed, move at all unless considerable force is brought upon it. So that both large and small pictures may be taken, there is an arrangement in the frame-work for lowering or heightening the focussing screen or dark slide, the latter being kept in position by a simple wood clamp. The whole frame-work and trolley together is so simple that any carpenter could put it together, its solidity being one of its most valuable qualities.

The studio is one of the smallest we have seen in a first-class studio, and you wonder at first where the dark-room and laboratory can be. There is but one camera visible, with a hood extending some four feet in front of the lens; but although room is limited, there is not the least sign of crowding. Mr. Grove believes in simplicity in a studio, and it is well he does so, otherwise a glass room twice the size would not have sufficed. While there is but one camera, there is a whole battery of lenses, here, under the table, of all sorts and sizes to fit it. Our host makes use of a universal adaptor—or universal front, it might be called (see fig.); that is to say, instead of having half-a-dozen spare flanges to each lens, he has each lens screwed into a front, and the whole series of fronts (all of the same size) lift in and out of the one camera.

Another simple arrangement is the method of supplying the plates from the dark room. This is underneath the studio, so that there is no smell of collodion in summer time, and the heat is never oppressive. A little shaft runs down into the apartment beneath, and the carrier and plates are in this wise conveyed to the glass room. There is a speaking-tube, moreover, between the apartments; but signals are usually conveyed by a whistle. One whistle from below means that the plate has been developed and is all right, and that the visitor may be bowed out. In these circumstances, even gelatine plates may be developed before the sitter departs, for there is no delay in immersing the plate in the oxalate bath. As only one sized plate is used in the establishment, whether for carte or cabinet pictures, simplicity here comes in again to aid in the work.

Mr. Grove's highest class of work is the red carbon portrait upon porcelain. We do not know if our host represents the only firm of portraitists in London who are carbon printers, but we rather think so. Here is the developing room, and here the

three huge tanks, some three feet square, required for the process. The first is for warm water, the second for cold, the third is the alum bath. The carbon printing is conducted under Mr. Grove's personal supervision, for it is, as everybody knows, touchy work at the best. It is not unusual to develop a score of pictures in order to obtain one that will please. "You may secure a very good impression on the second or third trial," said Mr. Grove, "but then you always try again to see if you cannot get a better one still." When you have a good carbon print, it is worth all the trouble, our host thinks, and he is quite satisfied, apparently, with the results of his tedious labour. Certainly it is not everybody who would work so hard for success.

Carbon portraits upon paper are more difficult to obtain perfect than upon opal; the pot-metal helps out a good many defects, and the film dries upon the surface in a more satisfactory manner. It is Mr. Grove's opinion that carbon pictures—at any rate, for large portraits—must become popular, since the public are gradually getting to know of their permanence, and will in the future be satisfied with nothing else. But it is very plain—and Mr. Grove speaks as a carbon printer of many years' standing—that indomitable perseverance and inexhaustible patience are indispensable in the production of high-class carbon pictures.

THE WOODBURY PERMANENT PRINTING COMPANY AT KENT GARDENS, EALING.

IN a remote corner of Ealing, where the suburban villas come to an end, and the madowland slopes away to the green hills about Harrow and Pinner, are to be found the works of the Woodbury Permanent Printing Company. The Company has evidently a notion of taking care of itself, for at Brompton, we remember, where it was last located, the neighbourhood was an exceedingly agreeable one, and there are certainly few working establishments in and about London which can boast so fine a site as Kent Gardens, Ealing. The building is nothing less than one of the fine villas that are here to be seen in goodly number, or rather, we believe, an hotel, it is so spacious; the rooms are light, airy, and lofty, and the grounds amply suffice for the outhouses—printing sheds, studios, developing rooms, &c.

—which are necessary to the carrying on of the multifarious duties with which the Company occupies itself.

The Company produces its own carbon tissue, for, as our readers are aware, it has acquired for some years past a high reputation for enlargements printed in permanent pigments, and possesses all the necessary facilities for printing and developing; but, as a matter of course, it is the photo-relief or Woodbury process that constitutes the chief feature of the Kent Gardens establishment. The Company has it all its own way when it comes to a question of rapid printing from portrait negatives, and, what between electioneering orders and orders connected with Royal marriages, there is plenty to do. Election agents are very much alive to the publicity which photography is capable of giving to the features of the respective candidates, and orders are sometimes given for as many portraits of a would-be member as there are voters on the election roll. Again, the daughter of King Rumpeltiltskin is a favourite just now, the Princess Badoura, for she is shortly to be married, and Continental dealers are clamouring for her portrait. Comes an agent across the seas with a couple of negatives of the fair Princess; he will not leave them—they are too precious—but waits uncomfortably for a few hours at Ealing, while the necessary gelatine moulds are made for printing off the pictures mechanically. Then he travels back again post-haste to continue solar printing, which has been momentarily interrupted, leaving behind him instructions to despatch 50,000 copies of the fair Princess as soon as Ealing has stamped them off.

Our readers are well acquainted with the Woodbury process, we know, but we shall nevertheless take the liberty of briefly describing it once more as it stands in its present state of perfection. The first room is where the sensitive film is kept. It is in thin transparent sheets, and consists of gelatine with a backing of collodion treated with bichromate solution; it very much resembles the gelatine employed for cracker bonbons, only it is tougher and a little stouter. After sensitizing, it is put into a chloride of calcium box to dry, the operation being there very steadily and thoroughly carried out. The sensitive gelatine film is put under a negative in an ordinary printing-frame, and printed in the sun. They used, at Brompton, to put the printing-frames at the bottom of a box, to ensure the rays coming straight down upon the film; but this they find is not necessary if the frames

are made to face in the direction of the sun. But direct rays are indispensable to the production of a good photo-relief. The gelatine film, by printing under a negative, becomes insoluble in parts (where the light has got at it), and the consequence is, that when immersed in warm water, only a portion of the film washes away, leaving an image of the negative in relief. The washing takes place very gradually, the film being placed on end, and the water passing through. The shadows in the negative being represented by transparent patches of glass, the light has worked through here, and the result is that the gelatine film is, after washing, all over prominences, these prominences being the shadows; and they are more or less in relief according as the shadows were deep or otherwise, or according, as we have said before, as the glass negative was more or less transparent. These gelatine impressions are permitted to dry upon patent plate glass so that they may be perfectly flat, and are further toughened with alum. Stripped from the glass when dry, we have a perfect mould, in which the shadows are represented by prominences, and the lights by hollows.

Now comes the production of the metal plate, which is taken from this gelatine mould. There are two hydraulic presses in this room for pressing the gelatine mould against a sheet of lead; one of these presses is capable of exerting a pressure of 150 tons, and the other, which is employed for pictures up to 14 inches by 10, is equal to giving a squeeze of 500 tons. It is the necessity for having the presses which evidently stands in the way of Woodburytype becoming vulgarised; that is to say, photo-relief printing is of itself such an elaborate industry, and requires such expensive apparatus, and withal the employment of so many skilled hands in one department and another, that unless a photographer sees his way clear to issue hundreds of thousands of prints, it would never be worth his while to take up with the hydraulic process, although, it is true, Mr. Woodbury's new Stanotype process bids fair to bring photo-relief printing within the means of the every-day portraitist.

Pure lead is employed for securing the counter-mould of the gelatine film, the lead being rolled into plates. A steel plate serves to rest the gelatine mould upon, and this steel plate forms, as it were, the bottom of a tray, the sides of the tray being sharp knife edges. The reason of this tray-like formation is soon evident. The gelatine mould, as we say, is put upon the

steel bottom of the tray, and then a sheet of lead, larger than the tray, is put upon it. When subjected to pressure in this way, the knife edges cut the lead, and the latter thus accurately and entirely fills up the tray. The gelatine film cannot escape the pressure, because of the steel plate below, and the consequence is that the lead is pressed into every detail of the gelatine, and these details cannot spread, because the tray is completely full of metal. The consequence is, that the comparatively frail gelatine impresses the metal plate with its likeness. The pressure is so evenly and skilfully managed, that they say a fern leaf can be put in the tray and pressed; and the fern leaf, soft and yielding as one might suppose, is still capable under the circumstances of impressing its form on the metal.

We have in the lead plate an engraving in which the shadows are now represented as deep hollows, and the high-lights by prominences; indeed, the deeper the shadow in the original photograph, the deeper are the cavities. We now proceed to another room to see the process of printing from these metal plates. It is a large apartment with eight circular tables. There is a printer at each table; the table revolves on a pivot, so that he can bring under his hand, one after another, a series of printing presses, of which there are seven to each table, fixed round the margin. The process of printing consists in the fact that you employ a dark transparent ink, and the thicker the layer of this ink upon paper, the blacker it appears. The printer opens one of the presses, and you see, face upwards, the metal plate; he pours a little pool of the warm gelatinous ink upon the plate, claps a sheet of white paper on the pool, and then, with a turn of the handle, makes the paper press down upon the plate. The result is that the superfluous ink is squeezed out, and when you open the press again presently, there is an image made up of ink of different thicknesses. The hollows in the plates have permitted a good deal of ink to remain, thus representing the shadows of the picture, while in the lights nearly all the ink has been pressed out, and in these portions the paper is white—or almost white.

As we have said, each printer stands before a round table that revolves. He has seven presses to attend to, and inks them one after another; a minute, or rather more, is consumed at each revolution of the table, so that the gelatinous ink of each picture has this time to set. They are printing a portrait of Miss

Genevieve Ward at this table, as she appears in "Forget-me-Not," at the Prince of Wales's; it is to illustrate a theatrical journal. The printing goes on very fast; a wine bottle, kept warm in a water-bath close by, holds the ink, and from this it is poured upon the shining metal. There is a dirty pool of liquid, and a white sheet of paper clapped upon it; a turn of the press, and the moment afterwards the pool and the paper are converted into four Miss Genevieve Wards, all looking as stern as stern can be, but as fresh and perfect as a clean silver print. The inking goes on, the table revolves, and the Miss Genevieve Wards accumulate, until a boy carries them off to a canvas tray to dry, of which there is a perfect stack in the department; 30,000 cartes can be here printed in a day.

Only the purest pigment obtainable—Indian ink—can be employed in the printing of Woodburytypes, for accidental particles of pigment, however small, would ruin the pictures if they appeared in any of the high-lights. The process, so far, looks simple enough, but in practice there are many difficulties to contend against. The matter of securing perfectly good prints depends upon the printing surfaces being perfectly flat. Any unevenness of the paper is enough to spoil the picture, for as the printing is simply the accurately pressing out of superfluous ink between paper and plate, if these are not both perfectly level, one side of the print will have more ink than the other, and hence the picture will be dark on one side and light on the other. Great care is, therefore, taken to flatten the paper used in printing. It is pressed between steel plates, and, moreover, varnished and gelatined to prevent the ink subsequently being pressed into the pores of the paper, for the Woodbury print, to be successful, must be a true surface print.

In other rooms, the drying, aluming—for the gelatinous picture requires to be tanned to render it permanent—sorting, flattening, and mounting take place. The Woodbury Company gives employment to something like sixty hands, and this number will soon be further increased, for the managing director (Mr. Whitfield) contemplates extending his carbon tissue manufacture, and having an electric light, with suitable engine, on the premises, for helping in his work. The Company appear to do anything and everything in connection with photographic printing. From Mr. Whitfield's well-known work, "Men of Mark," down to all sorts of advertisements and show-cards, executed in thousands,

for wholesale houses, the Kent Gardens Establishment occupies itself. Here are pictures of rifles, fowling pieces, vases, shirt-fronts, fenders, fire-irons, neck-ties, pianos, &c.—photographs produced by the thousand. We peep into the glass-house for a moment, and cannot repress a momentary shudder at the uncanny appearance that meets the eye. First of all, it looked like a group of personages perfectly immovable; then it resolved itself into so many heads, hanging lifeless, a sort of Blue Beard's chamber; and it is only on a second glance that we perceive there is but a collection of head-dresses, with no heads in them at all. Our guide evidently notices our scared look, for he says: "Oh! that's nothing; we had a hearse here yesterday."

The Woodbury Company are famous, as everybody knows, for their transparencies for the lantern. Photographers frequently send a whole series of negatives to be made into lantern slides (sufficient for an hour's lecture or entertainment), and, during the autumn and winter months, work of this kind is one of the Company's chief occupations. The transparent gelatine ink is thoroughly well adapted to the magic lantern, and permits the light to pass far more freely than it can do through the opaque particles of a silver positive. The way to make it will be found on referring to the chapter devoted to Mr. Woodbury.

MR. WILLIAM MAYLAND IN REGENT STREET.

SOME years ago official business called us to Marlborough House. It was a cold foggy morning at the fag end of October, and the wide vestibule struck us as intensely chilly, on our entrance; moreover, on ascending the thick carpeted stairs, we were ushered into a room on the first floor in which the door was kept permanently open. It was the equerry's room, and that gentleman received us with exceeding courtesy. But he, too, was cold, and his faultless attire did not give one the impression that he derived any warmth from it. Our conversation was conducted in tones scarcely above a whisper, and there was a degree of unrest observable that was anything but comfortable. The open doorway commanded three corridors—the one by which we had ascended, that continuing past the equerry's door, and a third *en face* in the direction of the Prince's apartments.

These corridors it seemed the equerry's especial duty to watch, and, during the period of our visit, that officer never took his cold eye off the doorway. Portly footmen in red coats, white stockings, and low shoes came and went without a sound, and startled you by their vivid appearance in the chill silence. Our companion was "family doctor" to the Princess of Wales, and, by virtue of his position, indulged occasionally in a little joke by way of thawing the frigidity that prevailed; but the equerry did not unbend, and even the brisk entrance of Prince Arthur (he was not Duke of Connaught then), who good humouredly exchanged half-a-dozen bright sentences, was without effect upon the stern official. But as we still waited and watched the corridor opposite, and His Royal Highness failed to appear, the equerry, knowing that the doctor and ourselves were conversant with photographic matters, mentioned the circumstance of some little enamels having just arrived for the Princess, and these he submitted for our inspection. They were medallions of the Royal children, and taken, he said, by a little firm in Regent Street, of which he did not quite remember the name, but he thought it was that of Mr. William Mayland.

Since that day Mr. Mayland has had the good fortune to win a medal for photographic enamels, the only award of the kind, we believe, given in England. Like his late partner, Mr. T. R. Williams, he appears to confine himself to small work of exquisite softness and finish, and to trouble himself little about other phases of portraiture. A saunter round the reception-room of the "little firm in Regent Street" at once supplies the reason why Mr. Mayland receives such distinguished patronage. Her Royal Highness the Princess of Wales might well choose the "little firm" to execute her work, for in enamels and the portraiture of children evidently lie Mr. Mayland's strong points. Here is an infant Hercules, bold and defiant; here, two tiny children, muffled up against the cold, standing opposite one another; you can almost see their breathing in the cold air, and they seem to have served as models for Kate Greenaway, whose pictures have been so popular this winter. They wear little coal-scuttle bonnets, and quaint cloaks of fur, and their chubby cheeks are aglow with health. Here is a lady in a garden hat, feeding a canary (a delicate cabinet picture this), and here is a row of military heroes, for once without any semblance of loudness and vulgarity. One reason, no doubt, for the general

success of these pictures is the fact that Mr. Mayland, and Mr. Mayland alone, is the author of them ; every sitter, we are told, has his personal attention.

We go upstairs into the studio to see Mr. Mayland, ushered by a polite young lady, who harbours grave doubts, however, as to the policy of our visit. She scarcely holds with our notion of giving an account of what we see ; but consoles herself with the reflection, expressed naively enough in our presence, that "to be sure it does not matter much, for not one in ten will ever look at it." Mr. Mayland is busy with a sitter—a clown in motley. He is not a large clown ; in fact, he is a very little one—a tiny scaramouche who has been present at some fancy ball, and whose mamma desires that he should be perpetuated in Grimaldi attire. We ask Mr. Mayland not to mind us, and he does not.

We always thought photographers had an aversion to children ; at least, half the woes of which disciples of the camera complain seem to take their rise from tender offspring ; but to Mr. Mayland such work seems to afford the greatest treat in the world. The way in which the little fellow is entreated, prayed, joked, cajoled, and flattered, makes him eminently obedient. No wonder Mr. Mayland is one of the few photographers in London who seems entirely successful with children. He has in an eminent degree that rare combination of qualities—patience, perseverance, tact, and skill—combined with that delight in the work, which is necessary for managing juvenile humanity. In a word, he converts what to many little sitters is a trying ordeal into a merry game that they thoroughly enjoy.

The glass-room of the "little firm in Regent Street." can scarcely be regarded as a model, and, therefore, it need not be described in detail. In fact, to many photographers it would be a wonder how such softly-rounded features, such delicate modeling, and rare finish could be here secured of this perfect manner in a studio which has no side-light, but one directly facing the sitter, and this of a westerly nature. Fortunately, there is an ample supply of illumination (indeed, the studio was built for Daguerreotype work, when light, and plenty of it, was the only consideration), so that a good deal may be done with curtains and screens ; but it is only between the hours of 10 and 12·30 that Mr. Mayland can work with effect. The studio has a length of thirty-three feet ; the skirting-board facing the sitter

risers some three or four feet, and then, after a few feet of window, there comes the sloping glass roof.

To shade his cameras, Mr. Mayland was formerly in the habit of employing a canopy overhead ; but this, by reason of his defective lighting, he was compelled to abandon. He now uses but two tiny laths which project in an upward direction beyond the lens some eighteen inches, and over which a piece of black velvet is spread. With a view to amuse children, there are plenty of quaint pictures of the Reinecke Fuchs order on the walls, while another marked feature is a round disc of chamois leather with a bleeding heart in the centre. Fortunately, before we had taken a sketch of the latter to present to our readers, as a novelty for attracting the sitter's attention, we were informed that it had no photographic value at all, but was there simply for the purpose of practising with the foil ; for Mr. Mayland, it seems, is a skilled fencer.

Mr. Mayland was good enough to develop some gelatine plates in our presence. He employs for the purpose only artificial light. He has had a lamp expressly made, which is of metal on all sides except the face. This has a drop front of ruby textile fabric, purchased of Mr. Thomas, of Pall Mall. The lamp measures about twelve or fourteen inches in height, and has a gas burner, which is always kept low. He develops, after the sitters have left, the whole batch of negatives taken during the day. He cuts his double plates into halves with a diamond ; immerses the first in the developer, and acts upon the second with a weaker or stronger solution, as the first seemed to indicate. The development of the first plate is quite sufficient for all the rest. To ascertain whether a gelatine film is perfectly clear (for it should not have the slightest tinge of brown), it is placed upon a sheet of white paper. The brown tinge is evidence, not that the solution was not strong enough, but that there was too little of it. With plenty of developer, followed by an alum bath, no browning of the transparent portions will ensue ; and how detrimental to the printing qualities of a negative this brown tint is, need not be stated. For retouching, he employs, before using his pencils, a little of the "autotype medium," which answers very satisfactorily in his hands. The negative is moistened with this "medium" by means of a bit of rag, and, in five minutes, is as good as paper for pencilling upon. B or HB pencils are used, and if the retouching does not please, it is easily

removed again by the "medium." When the negative has been satisfactorily retouched, it is varnished. Mr. Mayland has not employed a wet plate for two winters in his studio, and he estimates the comparative sensitiveness of his gelatine films at about eight times that of collodion.

Mr. Mayland was good enough to show us his laboratory for the preparing of enamels, and the muffle furnace he employs in his work. The process is of so delicate a nature that he can trust it in no other hands than his own.

To those interested, we may mention that the charges made by the "little firm in Regent Street" are respectively a guinea and a guinea-and-a-half, the former entitling the sitter to twelve carte portraits, and the latter to eight cabinets. The charge made for enamels is from two guineas.

MR. LEON WARNERKE AT CHAMPION HILL.

MR. WARNERKE'S house is not difficult to find, although the pleasant suburban neighbourhood is unfamiliar to us, and the shades of evening have fallen, as we climb the slope of Champion Hill. We know the thoroughfare, however, and we have been told we shall find the house plainly marked when we get to it; and so it is. Although darkness is beginning to enshroud trees and houses, the word "Silverhowe" presently shines forth on a gate before us in clear white characters. "The name is written in phosphorescent paint," explains Mr. Warnerke, laughing, when we congratulate him on the matter. How fervently we wish the plan were generally adopted in town and suburb. Phosphorescent paint would save many a grumble at dinner parties; fewer tempers and fewer dinners would be spoiled by late-comers.

Mr. Warnerke is an indefatigable experimentalist, as every photographer knows, and since there is scarcely any branch of the art-science in which he has not engaged, a visit to him is unusually interesting. The only difficulty we experience is that of giving our readers anything like an adequate account of our pleasant reception, for as we move from one room to the other, chatting upon a hundred and one subjects, it occurs to

us more than once—and very vividly, too—that our humble powers can but faintly reproduce the many interesting facts put before us.

This is Mr. Warnerke's chemical laboratory, a roomy apartment fitted with all the appliances of the modern chemist. There are no less than five Sprengel pumps in one corner, a portable gas engine on wheels in another, apparatus for mixing rubber solution, for collodion making, for the preparation of phosphorescent calcium, and a vast paraphernalia of utensils of various kinds. A photographic laboratory, or dark room, is next door, and upstairs we find a room devoted to mechanics, for Mr. Warnerke is an able mechanician as well as chemist. Those acquainted with his roller dark slide know this; but only those who, like ourselves, have seen the most recent form of this ingenious contrivance, can fully appreciate his talents as a theoretical and practical worker. And this leads us to speak of the most important feature of Mr. Warnerke's recent investigations. The preparation of a flexible sensitive tissue of gelatino-bromide is now an accomplished fact, and we had the pleasure of inspecting not one or two film negatives of this description, but a series of one hundred. The series represented, too, the *first* negatives produced on the *first* batch of tissue; and when we say that of these experimental pictures, three-fourths at least were really good photographs, while of the rest, scarcely one could be pronounced bad, we have said enough to show that good times are, indeed, coming for photographers, and especially for those who engage in travelling and out-door work. Having ourselves made practical trial of the old form of Warnerke tissue and roller slide, on two mountain tours, we feel at liberty to speak with some emphasis on the point; and if tissue as rapid and uniform in quality as the ordinary commercial gelatine plate can be prepared, we prognosticate a grand future indeed for Mr. Warnerke's recent invention. The new tissue, we are glad to hear, is made without india-rubber, the paper on which it rests being simply coated with gelatine; and the resulting film is so stout and durable that the negatives may be safely printed without a glass support, an advantage too apparent for us to dwell upon.

Our readers may be familiar with the former roller dark slide. There were two rollers in a box, and the tissue, as it was exposed, a small area at a time, left one roller to embrace the other.

There was a tiny window or opening in the box, to enable the photographer to watch the progress of the tissue as he unrolled it, to bring forward a fresh piece for exposure; and by watching for numbers in succession—for instance, 3, 4, 5, 6, &c.—he knew when the tissue was properly fixed in position for exposure. Our own roller slide held a strip of tissue enough for forty pictures, and not until this number of exposures had been made, and the number 40 appeared through the little window, was it necessary to replenish the apparatus. Obviously such an arrangement will not answer for a highly sensitive gelatino-bromide film; ruby and yellow glass combined would no doubt be sufficient to protect the tissue in the slide, but then it would be impossible for the photographer to read numbers on the tissue through this double thickness of glass. Mr. Warnerke, therefore, constructs his new roller slide differently. The long band of tissue, ere it is wound on the roller, is provided near the edge with a series of small perforations or holes. If it is a five-inch roller-slide, to take pictures five inches high, these perforations are punched at intervals of five inches. The tissue is now wound round the upper roller, and stretched down to the lower one, in which position it is ready for use.

We will now suppose the first exposure has been made, and the photographer desires to shift the tissue, so as to bring a second surface into the field. He revolves his rollers, by an ingenious arrangement that we need hardly describe in detail; the two rollers are set in action by turning one handle, and the tissue passes from one roller to the other. Presently a bell rings; it is the signal to stop. The perforation in the tissue of which we spoke just now has arrived at a certain spot, and a little metal stud comes into contact with a metal surface from which it has hitherto been separated by the tissue. A tiny chloride of silver battery, that finds a place, with the electric bell, inside the slide, furnishes the electric current, and the bell continues to ring so long as the metallic contact continues.

While admiring the ingenuity of this perfect little arrangement, many will be tempted to ask whether the rollers and the bell and the electric battery do not make up together a somewhat costly and elaborate bit of mechanism. The idea is very natural, especially by reason of our wordy explanation. But a glance at the apparatus suffices to dispel any fear of this sort. The bell is not much bigger than a thimble, the battery is equal in bulk

to a couple of fingers, and the cost will not exceed one-fourth more than the sum formerly charged for a roller-slide. The slide we were shown had its battery fitted in May last; it had done a journey to Russia and back, and been transported by rail, steamer, and camel, and served for the production of three hundred tissue negatives. Yet its power was still intact, and the bell obeyed the current immediately.

We should like to describe some of the pictures. Here are interiors, with all absence of blur about the windows—this is a most important quality inherent to the tissue—and here is a picture of the quays on the Dwina taken from a moving steamer, Mr. Warnerke's camera being provided with one of Cadett's clever shutters. Here is a village dance by Russian woman, their handkerchief head-dresses reminding one of Lancashire lasses. Here is an open-air theatre at Warsaw, the strangest spectacle in the world; the proscenium is surrounded by natural decorations, trees, shrubs, &c., with a space for the orchestra in front, while the auditorium, in amphitheatre-shape, is separated from the stage by a placid river which forms an effectual gulf between players and spectators.

Most of us are acquainted with the actinometer and sensimeter of Mr. Warnerke, but few know of the labour and calculations these cost to devise. In the case of the actinometer, indeed, the work had to be done a second time, for Mr. Warnerke's first calculations were based upon daylight in February and March, and when the summer time came, provision was found to be necessary for measuring light of much greater intensity. To ensure all instruments being of the same character—or, in other words, the deposit of coloured medium in the different degrees being all of the same thickness—Mr. Warnerke works from one standard only. Thus, having by means of paper layers built up his degrees of various thicknesses, he takes a cast of these in Spence metal. This, the original cast, represents the standard, and is carefully put away, after supplying moulds in plaster of Paris; like they do the original die of our sovereign at the Royal Mint, it is kept as a record after it has served to strike off a matrix. From the plaster of Paris mould other impressions in Spence metal are taken, from which the scales are printed.

Spence metal has occupied much of Mr. Warnerke's attention of late, and in his hands it bids fair to become a most valuable photographic material. The suggestion first made by us to

employ Spence metal for photo-relief printing Mr. Warnerke was not slow to adopt, and he was good enough—as some of our readers may remember—to publish the results of his first experiments in the *PHOTOGRAPHIC NEWS*. Since then, he has assiduously continued his investigations, and has prepared photo-relief or Woodbury plates of Spence metal, and fitted them in adequate printing-presses. As we have said, the scales of the Warnerke sensitometer are printed off from Spence-metal moulds. With the employment of Spence-metal, Mr. Warnerke hopes further to overcome the stumbling-block which has stood in the way hitherto of producing large Woodburytype prints. The difficulty of getting large metal surfaces truly flat is almost insurmountable, and if printing surfaces are not true in Woodburytype printing, an unevenness in inking results, and uniform pictures are unobtainable. But the easily-molten Spence metal will supply any number of flat surfaces without difficulty, if care is only taken to cast it upon a true level; while the delicacy of its impression may be gathered from the fact that a finger mark upon the mould is reproduced in the Spence cast in the most perfect manner.

Mr. Warnerke was good enough to show, too, how he printed his black figures on the sensitometer, and as photographers may sometimes find it convenient to be able to print letterpress on a glass surface, we communicate his ingenious method. Mr. Warnerke makes use, for the purpose, of an ordinary clothes-wringing machine, provided with a rubber roller. What is wanted on the glass surface is printed first of all on paper in a printing-press in the usual manner, and then, while the ink is still fresh, the paper imprint and glass plate—face to the glass—are passed through the wringing-machine at considerable pressure. There is no risk of breaking the glass, and, if the pressure is sufficient, the print-off is exceedingly black and clean. If the ink is dry on the paper before it can be used in the wringing-machine, no doubt a little turpentine rubbed on the back would at once facilitate its transfer.

Mr. Warnerke, besides the preparation of his new gelatino-bromide tissue, is also busy establishing the preparation of gelatine plates in Russia; and we may mention that Nelson's No. 1 flake gelatine and ammonium bromide are the staples he prefers in the production of the sensitive film. The gelatine in question, in his experience, is much more free from "plague spots" than any other description with which he has worked, a dictum that many of our readers will be glad to note.

A CITY PHOTOTYPE ESTABLISHMENT.

OUR visit has to be made at twice, for the photographic operations connected with the preparation of phototype blocks cannot be undertaken in the city. But first a few words by way of preface. The word phototype is so universally applied to all sorts of photo-mechanical printing, that it has almost ceased to have any definite meaning, and, therefore, the process we are about to describe requires a little explanation. It is the production of typographical blocks—blocks that can be worked in the ordinary printing-press along with type we refer to, and which, as we shall presently show, are produced by a combination of three arts—viz., photography, lithography, and etching. The production of these printing-blocks has of late become a busy trade, particularly in Paris, London, and New York. We mention Paris first, because it seems to have been the cradle of the art, and the employés in London are for the most part Frenchmen. We can get plenty of good photographers and lithographers in this country, it appears; but those who understand etching are few and far between. If you can call to your assistance a skilled photographer, a skilled lithographer, and a skilled etcher, then there is little difficulty in the production of typographical blocks by the aid of photography; but it is only in the presence of these three that success can be hoped for. The difficulties in the way of producing good work are so many that it requires the most practised in each craft to contend with them; and let a man be ever so ready in understanding the three processes involved, if he has not served an apprenticeship to them all (and this is very unlikely), he will not succeed unaided.

The *raison d'être* of these phototype establishments is not far to seek. Our cheap illustrated newspapers cannot pay for wood blocks—at any rate, for all their pictures—and a less expensive substitute is imperative. Photography stands ready to lend a hand in the dilemma. Any picture that appears in the foreign illustrated journals of sufficient interest is made to do duty again over here. The picture is sent to a city phototype establishment, and, in a couple of days, a suitable printing-block is returned. It does not matter what the size of the original picture may be, or what is the size of the block desired; the camera is ready to

bring about any modifications of this kind that may be requisite, and the work is done—thanks to considerable competition—at a very low rate; the charge is but threepence halfpenny to five-pence per square inch, so that a zinc printing-block, measuring four inches each way, is produced for less than eight shillings.

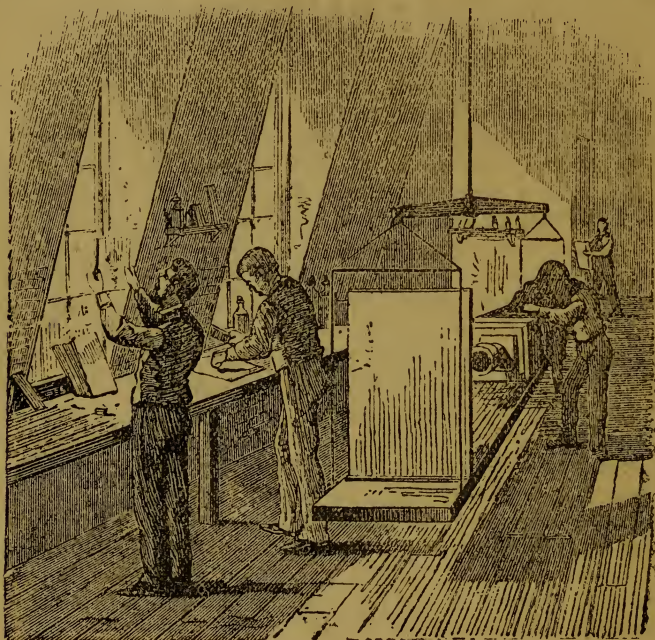
The “studio” we visit—if an open, glass-roofed shed can be dignified by the name—is the most simple of its kind within our knowledge. The photographic arrangements, too, are of a most primitive description. There is a solid square table in the middle of the apartment, measuring about four feet, and the camera, with a long base-board, is pivoted on it. The base-board, if it may be so termed, is continued in front of the camera, and ends in an upright, against which the picture to be copied is placed. It is rare that any large work has to be copied, and rare, too, that the picture has to be reproduced the same size as the original. The camera is, indeed, somewhat small for the purpose, capable of taking nothing larger than a twelve-inch plate. “But we never have an order for any very big work of this kind,” says our informant.

The camera and base-board is so loosely pivoted, that it can not only be revolved with the greatest ease to suit the lighting, but either end—camera end, or the end at which the upright and picture are—may be heightened or lowered, which is done simply by wedging a block of wood underneath, much as if it were a see-saw. A rectilinear lens, of twenty-six inches equivalent focus, is employed for the work, and the negatives present no point of difference from ordinary photo-lithographic plates. Transparent lines upon an opaque ground is, of course, the result aimed at, and this is produced by the ordinary bichloride of mercury intensifier, although, to our thinking, the Eder and Toth lead intensifier, in use at the Woolwich Photo-lithographic Establishment, gives greater opacity, and is more simple to use.*

Before quitting this part of the establishment, attention was called to the “balance” arrangement for copying-cameras, in use in America, and of which we give a sketch. This arrangement would be found particularly useful for phototype work, and we may mention, by the way, that this cut was reproduced from the *Scientific American* by the phototype process we are now describing. By its means the camera and object are always kept parallel.

* See the “Woolwich Photo-lithographic Establishment.”

The lithographic and etching operations are carried on in a dark little court in the vicinity of Fleet Street, and thither we journey in company with some prints upon bichromated gelatine



paper from the negatives we have seen taken. The "studio," we have said, was rough and crude enough, and the workshops here are in keeping with it. The place is littered with old frames and dirty machinery; but there is plenty of work going on, nevertheless. This first division of the shop is confined to lithography; at the further end the etching process is gone through.

One of our prints is faced with ink.* The lines of the drawing, which previously were of a dark brown upon the yellowish bichromate paper, appear, now the superfluous ink has been removed, of a jet black, the viscid ink standing up in

* The velvet roller, described in the "Woolwich Photo-Lithographic Establishment," might be used here with much advantage.

ridges. In the photo-zincographic process, as it is carried on at Southampton and elsewhere, this impression in fatty ink, or transfer, would be laid upon the zinc plate, and the latter then etched in acid. But it is different in producing a typographical block, and this is a point to which we want to direct our readers. The inked photograph is first put upon stone before it is transferred to the metal. This is an important point, and this is where the skill of the lithographer is made use of. He can produce a much better result on a lithographic stone than on a zinc plate. The former surface is so even and smooth, and, moreover, is so well in hand in the press, that if the photo-lithograph is at first deficient in some respects, it is soon improved under the hands of the lithographer. We see our print now on the stone to which it has been transferred by pressure, and the lithographer, by all the little means at his disposal—inking-rag, acid-sponge, scraper, roller, and camel-hair pencil—coaxes and amends the image to such a degree that we hardly know it again. One sees at once why a skilful lithographer, and not one who has a passing acquaintance only with the process, is necessary.

The black-lined image on stone, now well rolled up with the ink roller, and with no trace of that rottenness in the lines which was here and there visible when the picture was originally transferred, is now ready for re-transfer to zinc. If the first re-transfer is not successful, another may be taken, and so on, once the image is on the stone; so the intermediate process, besides its utility, acts as a sort of insurance against failure. An impression is taken on a suitable piece of transfer paper, and the latter is then pressed into contact with a well-cleaned zinc surface. The image in fatty ink now rests upon the zinc plate, and this is ready for etching.

The etching process in all takes from three to eight hours. A big shallow tray or bath is filled with water acidified with nitric acid. We dip a finger into the liquid; to the taste it is acid, but not unpleasantly so. This is the first bath, and a weak one. As the etching goes on, a stronger solution is employed. During the immersion of the zinc plate the bath is kept continually rocked by a lad who sits beside it. Ten minutes or a quarter of an hour passes, and then the plate is lifted out. It is taken to a side table and then rolled up with an ink roller as if it were a lithographic stone; thence it goes upon a heated slab, which quickly dries the plate; afterwards some finely-powdered resin

is sifted over it, and then the plate once more goes into the etching bath. This treatment is repeated at frequent intervals, the image being rolled up every time it comes from the bath, and powdered resin being sifted over, sometimes when the plate is wet, sometimes after it has been dried and warmed, according as the etcher sees fit. The ink and the resin preserve that part of the zinc which they cover from the action of the acid, and as the process proceeds, and the layer of ink gets thick, the etching may go on with increased rapidity. But until the fine lines are safely etched, it is necessary to proceed with caution. The heating of the zinc plate is for the purpose of melting the resin so that it may run down and protect the walls or ridges upon which the fine raised lines stand, and prevent any under-mining by acid. Towards the end of the process, as we have said, a much stronger solution of nitric acid is employed, and the eating away of the metal goes on apace. In the end the image appears raised from the surface of the plate to the extent of a twentieth of an inch, and the finished printing-block is before us.

AT MILLBANK PRISON.

It is a clear morning, but a sharp east wind is blowing over the parapet from the steely Thames, as our hansom carries us quickly along the Embankment. We pass the Abbey, Old Palace Yard, the tall and majestic Victoria Tower, the magnificent stone archway known as the Peers' Entrance, and then, suddenly leaving all these fine buildings and grandeur behind us, enter the narrow street that leads to Millbank. Here we come out upon the river again, and the wind blows more chilly than ever; or is it that solemn fortress-looking building, that pile of grim brick and barred windows, that causes the shivering? There is little time for reflection, for cabby presently pulls up at a massive stone gate, beside a black doorway all studded with bars and bolts.

A big round knocker confronts us, for all the word like a heavy iron fetter, but our unsteady hand fails to raise it. "Try the bell, sir," says cabby; who coolly waits to see how we get on, and, in the hope, no doubt, that admission will be refused, speculates about the chance of a fare back. But he is doomed to

disappointment. The door opens but slowly, and a little way only, it is true, but it opens sufficiently to show a warder in steel buttons and a shining chain with keys attached to his girdle ; he takes the card we thrust into the yawning crevice, and reads it. The card is satisfactory, and in another moment we are standing in the lodge, and indulging in a weak joke about the difficulty of getting into prison. But we are not there yet. Another iron gate has to be unlocked—after the first has been carefully shut—and we are then at liberty to enter confinement.

The shape of Millbank prison is that of a star-fish, the centre being occupied by the governor and various officers, and the radiating wings by the prisoners. We walk, unattended, along a silent and solemn avenue, to the central offices, the dull prison walls on either side, their embrasure-looking windows more like a fortress than ever ; there is no noise, and not a soul is to be seen. But we pass by a warder presently, standing in a recess so quietly that he quite startles us, and then we go by two others, one of whom has a note-book in which he makes an entry. We ask our way to the governor's offices ; a gesture, rather than words, is the reply we receive.

But once in the centre of the establishment, the aspect of affairs changes. You feel that chill wind no longer ; there are green leaves and ivy to gaze upon, and dilute sunshine even ; you pass through busy workshops and yards where men are at work and at exercise.

A cheerful office full of busy clerks is here, and comfortable furniture and a bright fire. There is a savoury smell of lunch about—of Irish stew, if we mistake not—which exerts quite an appetising effect. One begins to think that a prison is not such a bad place to live in, after all, for a short, a very short time, if—if—only they did not make such a bother about opening that big black door at the entrance. There is nothing unusual about anybody, now one grows accustomed to the scene. If it were not that the majority of the men were clad in a monotonous grey dress, and the minority wore a dark uniform with steel buttons and steel chains at their side, which have a metallic handcuff ring about them, one might easily mistake Millbank for some other Government establishment, say Portsmouth Dockyard or the Arsenal at Woolwich.

Armed with the governor's authority, a guide now leads the way to the photographic studio in which we are interested. He,

too, has a steel chain with a pass-key. Here is the glass-house—a little erection in a yard by itself. We enter. It is a model of neatness and cleanliness; in fact, we unhesitatingly say it is the brightest little studio we have seen in our experience of “At Homes.” The floor is as white from scrubbing as the deck of a man-of-war; there is not a thing out of its place; not a piece of apparatus is awry or in disorder; not a speck of dirt is visible. Strips of clean carpet are laid in the gangway, and where the sitter is posed the floor is painted black.

What about the lighting? it will be asked. The lighting, we reply, fulfils the requirements of a model studio, as we heard them recently expressed at the establishment of Messrs. Hills and Saunders. A high wall at some distance from the studio, that the sun cannot get over, so that there is little or no necessity for blinds. and the diffused light can be used as you find it. The Millbank studio is not lighted from the north, it is true; but there is plenty of illumination, and it may be employed without stint.

The photographer at Millbank is one of the steel-buttoned warders, and we congratulate him on his well-arranged studio. Here are some pictures he has just taken—half profile, bold, clear, and vigorous portraits, well lighted, and altogether unlike what prison photographs usually are. There is no ‘prentice hand here, and we say so. In reply, our warder unbends his austere manner, and introduces himself as a former acquaintance. He is no other than Corporal Laffeaty, late of the Royal Engineers, an apt pupil of Captain Abney’s, and one of the clever Sappers who took part in the Transit of Venus Expedition. The mystery is solved; no wonder the Millbank portraits of late have been so good.

A sitter is departing as we arrive—a man in ordinary attire, his short, cut-away beard giving him the appearance of a foreigner. Our guide sees our look of astonishment: “He is a liberty man, and is photographed in liberty clothes; he goes out next week, and has, therefore, been permitted to grow a beard during the past three months;” and on the desk we see a printed form referring to him, to which his photograph will presently be attached. “Seven years’ penal servitude, three years’ police supervision,” we note is upon it. His crime was forgery.

What, we ask, if a man refuse to be photographed just before the expiration of his sentence? Our guide smiles: “It is a

very simple matter; a man is usually set at liberty before his time, but only if he conforms to our regulations."

Our guide leaves us for awhile, and Mr. Laffeaty asks if he shall go on with his work. We reply in the affirmative, and he quits the studio to fetch a sitter. He is not long gone, for there are plenty outside in the yard we have just crossed, men in grey, ambling round the flagged area at a rapid pace at fixed distances from one another, and reminding you vividly of a go-as-you-please race at the Agricultural Hall. He is a young man of stalwart build, the sitter, when he appears, and he is as docile as a dog. He is clean shaven, and has an ugly black L on his sleeve, which means, poor fellow, that he is a "Lifer."

There is a wooden arm-chair for posing. "Look here, I want you to sit down like this," says our friend the photographer, placing himself sideways in the settle, so as to give a half profile. The convict does as he is told, and evidently enjoys the business immensely. "Don't throw the head back quite so much; there, that will do. Now put up your hands on your breast, so." For the shrewd governor (Captain Harvey), it seems, believes that a photograph of a man's hands is as important almost as that of his face.

The warder-photographer retires to coat his plate, and we are left for a moment alone with a "Lifer." Why shouldn't he make a rush for it, fell us to the earth, and have a try for liberty? He might be a murderer; that he had committed a terrible crime was certain from his sentence. Keep the camera between yourself and the man, and be ready to roar out lustily if he so much as move a muscle, was one precaution that occurred to us; or should we knock him down at once out of hand before he began any mischief at all? *

No such precautionary measures are called for. Indeed, it made one smile to think of such a thing as resistance. One might, perhaps, conjure up such thoughts as these in the presence of an imaginary convict; but the facts here are very commonplace. On the arm chair opposite you sits a young man, almost a boy, with a frank, good-humoured face—a poor fellow who is

* We hear afterwards that this convict was arraigned on a charge of murder; but a verdict of manslaughter only was returned. He stabbed a woman with a sharp pipe-stem, wounding her so grievously that she died in twenty minutes.

evidently luxuriating in a delightful moment of release from drudging work and monotonous labour. Do what you want him to? Will he be obedient? Why, he would stand on his head to please you and to escape for a few minutes longer his daily toil. And as to bravado and ruffianism; there is just the same difference between the daring robber, and this grey-clad, humble individual, as there is between a fighting cock with his plumes and feathers, and a plucked fowl on the poulterer's counter.

Mr. Laffeaty comes back to the docile prisoner, focusses, gives an exposure of fifteen seconds with a wet plate and No. 2B lens, and secures an admirable negative. "I have never had the least difficulty," he tells us, after he has taken back his charge, "either with the men or with the women. The men are apt to be too grave, the women are sometimes given to giggling; that is, perhaps, the only drawback I have to contend against. I never take any full-face portraits in the old style, and I think I have improved the photography itself of late. There was an article in the PHOTOGRAPHIC NEWS called 'At Home at Scotland Yard' some months ago, and I have taken up several of the hints given there."

Mr. Laffeaty has to work very quickly at times, and, as a consequence, develops and fixes at once, without waiting to intensify. The latter operation he does in the light, with a few drops of sulphide of potassium in water, a method which, while ready and effective, does not appear to give too much hardness.

We cross the yard once more to make a call on the governor. The grey coats are still hard at it at their go-as-you-please race, except a few men who have fallen out, and standing still with their faces turned to the wall like naughty boys. They have an hour's exercise a day, and some of them seem to be trying to get double the amount out of the time.

To Captain Harvey is, in a great measure, due the improvement in photography that has of late distinguished the Millbank establishment. He is good enough to show us several series of pictures. Here is Kurr, of turf swindling notoriety. This long face belongs to Paine, convicted the other day of poisoning a woman with drink, and who, it appears, was one of the men we just now saw exercising in the yard below. Here are the two Stauntons connected with the Penge mystery, and other more or less well-known criminals. All these are "first convictions,"

who are confined by themselves, and bear a much better character from the warders than the "habitual criminal" class, for whose special behoof photographic portraiture has been provided. It is for the passer of counterfeit coin, the burglar, and the swindler—who have little interest for the public, but a great deal for the prison and police authorities—that criminal registers are required, to aid the suppression and detection of crime.

AT PENTONVILLE PENITENTIARY.

A VERY mistaken notion prevails upon the subject of photographing prisoners. The popular idea is that the prisoners themselves are very unwilling to submit to the ordeal, and usually make all sorts of difficulties and disturbances, sometimes not easily over-ruled. Strange accounts have been published of cunning devices and ingenious tricks practised upon convicts in order to secure a photograph of their features ; and we remember seeing, not long ago, a talented picture, the subject of which was an unwilling sitter maintained in position by a couple of stalwart warders, while the photographer did his worst, or rather his best. Such representations work, from the nature of things, a marked impression upon the public mind, and hence is due the impression that the photographing of prisoners is peculiarly troublesome and difficult. But it is the exceptions that the public hear about, and not the ordinary operations.

No doubt obstreperous criminals are met with, from time to time, and no doubt, too, the photographer has often his work to do over and over again ; but some little experience has shown us that a more docile body of sitters than our convicts do not exist. We do not say this because, as photographers, they are easily satisfied—because they never offer a remonstrance or suggestion—never ask to see the negative—and, above all, do not importune for a second sitting. But, so far as we have seen, they sit quieter and steadier, and are more ready to fall in with the exigencies of photography, than their brethren in freedom.

Pentonville Penitentiary is the largest establishment of the kind in England. At the time of our visit there were eleven hundred prisoners within the walls, and a much larger number

can find accommodation if necessary. Every man sentenced to penal servitude comes to Pentonville, and the first nine months of the period of his conviction he passes there. It is during this period that he is photographed, and the photographic records of Pentonville thus include every man in the kingdom sentenced to penal servitude. There is the same strict watch and vigilance at entrance and lodge which we described as existing at Millbank. There is the same military discipline among the warders—the same grey monotonous appearance about the prisoners. Millbank had ivy and shrubs as its principal ornament; at Pentonville, it is the green grass plots upon which the prisoners rest their eyes for relief.

So that these green spots may exist within the tall sombre walls, grass is grown in the exercise squares, and circular paths of asphalte, some two feet wide, appear like gigantic rings one within the other. The prisoners are at exercise at this moment, and we can see them from a window in the governor's room, walking round and round the green—an outer circle and an inner circle of them, a warder on a raised platform looking on. The men are closer together than at Millbank, and step out with military precision, and for the most part with jaunty air and elastic step; some even smirk and smile as they catch sight of us at the window; swinging their arms and wagging their heads, there are not half-a-dozen who appear dull or dejected. Perhaps it is the bright sunshine that pours down upon them in their roundabout tramp. One poor fellow walks to and fro in a corner by himself; he has a wooden leg, and cannot keep up with the brisk march of his fellows.

On our way to the studio we pass through the central hall of the prison, the lofty white walls rising sixty or eighty feet on either side; tiers upon tiers of cells, having access to light iron galleries, one over the other, run the length of the hall, which is spanned at intervals by iron bridges. Warders are posted everywhere, in vestibule, gallery, and bridge. We look into one of the cells; it measures, perhaps, 12 feet by 8 feet, and contains a hand-weaving machine, at which the prisoner works. The cell is whitewashed, is very clean, and lightened by a window some nine feet from the floor.

The governor is good enough to show us the tailoring shop, the shoemaker's shop, the laundry, the infirmary (where a dozen poor fellows are lying in bed, but as comfortable, apparently, as

they would be in any hospital in London), and the kitchen, where huge boilers and stewpans are all attended by convicts. It is suet pudding day to-day, the only day in the week when there is no meat ; but the governor says it is a favourite meal, for all that, and we are invited to taste the pudding—a pound block like a tinned loaf—which is made of whole flour, and served with the same weight of potatoes.

Universal silence reigns everywhere—in kitchen, workshop, and yard, for a prisoner is reported if he so much as opens his lips. During the whole of his sentence he is forbidden to speak to anyone but the warders, and these, as we enter, salute the governor, and immediately call out their brief report without waiting for any invitation to do so.

The photographic studio is on the second floor of a solitary building in one of the yards, and has been built by someone possessing a knowledge of photography. The days are long since gone by when a wooden bench in front of the prison wall was the only convenience at the photographer's disposal. The glass room is, however, far from perfect, for not only is the aspect faulty, but the skirting-board rises too high to permit of a good side light. Indeed, when the prisoner sits down to be photographed, the line of light from the side is above his head. The consequence is, the top half of the studio is very light, where the sitter is not, and the lower half, where the sitter is, comparatively speaking, in shadow. But the photographer, who is at present entrusted with the work of taking portraits, is fortunately clever enough to combat with some success against the existing drawbacks, among which may also be cited apparatus that leaves something to be desired.

Six convicts file into the studio attended by a warder. They remove their caps, and sit down in a row on a form ; in grey jackets and knickerbockers, with shaven faces and cropped hair, they look like big school boys. One of them takes up a narrow black board, some six inches wide, and proceeds to write very neatly in chalk the number and name of the first sitter, the board being then placed above the man's head when his picture is taken. He sits on a high-backed chair, and with no head-rest remains perfectly still for the seven seconds the exposure lasts. "Look at those bottles in the corner," says the photographer, briefly, so that the man may turn his head a bit ; and then the lens is uncapped. A double carte plate is used ; but the men are

so steady that rarely is a second negative taken ; another convict takes the seat, and the narrow black board above the head is reversed, the back bearing the second man's name and number.

While the double plate is being developed, and another put into the slide, there is time to clean the black board, and put upon it two other names. There is no speaking ; the convict simply pulls out of his jacket pocket a wooden tablet bearing name and number, and this is copied.

"Look at those bottles," repeats the photographer, rather sharply, to his next sitter, for the man has not heeded the first request ; "and put your chin down." The sitter smiles faintly, but does not obey. Ah ! here is a refractory prisoner at last ; we are glad of it, for we shall be able to see how matters are managed. But we are disappointed. "He is deaf," says the warder, who no sooner comes forward and explains to the sitter, than the latter is all obedience.

According to the regulations, every prisoner's head should be depicted an-inch-and-a-quarter in length, but this is only taken as an approximate size. The photographer does better than measure the head every time ; he takes every one of the same proportion ; that is to say, the distance between lens and sitter is always the same, and is never varied, a measuring rod at once regulating the interval. In this way a much better idea of the size of a man's face and features is obtained than if large heads and small were all depicted of the same dimensions.

It is necessary to produce rather hard negatives, otherwise it is almost impossible to secure contrast of any kind. The men being shaven and shorn, they present little contrast in themselves, while the dress they wear, being of a dull grey and with few folds, makes but a poor monotonous result if the negative errs on the side of softness. Under any circumstances, with the black board and its chalk writing above the head, the hands pressed close against the breast—for a picture of the hands is deemed as requisite, as we have said before, as one of the face, from the fact that they are so much an indication of the man's calling—and the ugly dress, a prison photograph can never be anything but a doleful result ; but it is nevertheless satisfactory to find that the photographs, as photographs, have of late years been much improved.

Besides securing records of prisoners, the practice of photographing them has one other advantage. In itself it acts as a

deterrent of crime. Every criminal is aware that a picture has been taken of him, and he never knows how much this may be the means of bringing him to justice if he relapses once more into evil ways. He is apt to over-estimate rather than under-estimate the power of photography, and it forms, at any rate, one reason the more why he should refrain from crime hereafter when he is again a free man.

STUDIOS IN ENGLAND.

MR. H. P. ROBINSON AT TUNBRIDGE WELLS.

THERE are photographers and photographers. Perhaps in no other profession except those of literature and art do we find so vast a gulf as between the highest and lowest in photography. Among painters there is the President of the Royal Academy, and the humble producer of signs. Among authors there is the historian who is making his name immortal, or the poet Laureate, who is the glory of his generation, and the penny-a-liner who hunts up conflagrations, and writes sensational reports upon big gooseberries. In photography we have those who, by earnest study and thorough education, have elevated their art to the level of the great professions, and the man—to be found in every town—who manufactures cartes at a few shillings per dozen. We do not wish to speak deprecatingly of the low-priced photographer; he is just as useful in his way as are the humbler workers in literature in theirs; he performs an important duty to the community by supplying cheap portraits, which, if they do not stand high as art productions, present at least recognisable likenesses. It is his object to produce portraits at a cheap rate, and he does well what he is called upon to do. But it is not of him or his class, useful as it may be, that we have to speak, but of a gentleman who is truly one of the princes of the camera, who has helped to make photography into the great art, as, apart from science, it has now become.

The author of "Pictorial Effect in Photography" is so well

known to our readers in his pictures, which have been exhibited year after year, and gained medal after medal, that we have no need here to dwell upon the charming compositions that have issued from his studio. The poetry of "Fading Away" has not only stirred the breast of many onlookers, but has inspired the novelist, for in "Old Charlton" we may read of an incident suggested by this very picture. "When the Day's Work is Done" is another touch of pathos conveyed by the camera, and the same may be said of the gay summer scenes, the deep shadowed pools, the open heather, the breezy yachting pictures, that Mr. Robinson has transferred to paper. These works need no praise on our part, for the simple reason that their high excellence has been acknowledged by competent judges time after time.

There is, indeed, no other photographer living who has been honoured with so many medals for pictures and portraiture as Mr. H. P. Robinson, the awards in gold, silver, and bronze, which it has been his good fortune to receive, amounting at the present moment to more than half-a-hundred. The gold medal of the last Paris Exhibition—only one was given for portraiture—came to Tunbridge Wells, to the Great Hall Studio; and so great a show does the shining collection of awards make in Mr. Robinson's atelier, that one might almost mistake his vocation for that of a collector of medallions rather than that of an artist.

Mr. Robinson's studio is one of the very few buildings that has been built for the particular purpose they fulfil. Moreover, from the fact that it was planned and constructed after years of experience gained at Leamington and in London, we may take it that its design is well nigh perfect; but if further proof of this were wanting, it is afforded by the charming studies of children that meet one at every turn, and which, at one and the same time, proclaim the artist and the man of tact. For, in the case of these infantile portraits, the possession of art knowledge does not, as every photographer knows, alone suffice. The taste and rare skill with which the tiny sitters are posed and draped is easily accounted for, since, beyond being a fervid disciple of the camera, Mr. Robinson has been a painter all his life, the Royal Academy having admitted his work before he had attained his twenty-first birthday. But long study of photographic art, and of the requirements of camera and sensitive plates, has also

been necessary to give our host the command he exercises over his models; and the reason why so very few photographers succeed as Mr. Robinson succeeds, is because they either lack his knowledge, or do not take such infinite pains over the work. No doubt his studio permits him to secure more easily the effects he desires; but this, too, is the result of his labours as a photographer and artist combined.

Mr. Robinson's studio is remarkable from the fact that it does not contain one of Seavey's backgrounds. The backgrounds here are all prepared by our host by a modified Faulkner process. This clever method of Mr. Faulkner, which has now been published, was to rub wet chalks of the proper tint upon wet canvas, and afterwards soften down the effects with an ordinary clothes brush. This method of using chalks is as simple as it is effective. A skilled eye and practised hand are indispensable for applying them and wielding the brush; but any photographer who is something of an artist, will find the plan far more simple than the distemper painting. "Just took me an hour," said Mr. Robinson, pointing to a bit of sea and rock, against which he had been posing some bare-legged youngsters; the background had evidently taken their fancy, or something else, for their portraits were as lively and merry as if the beach were before them.

The studio measures thirty-six feet long by some fifteen feet wide. The lighting is north, and as the wainscoting at the side runs up to a height of five feet, it is from a steep sloping glass roof that the illumination comes. There are a few curtains, and of the most simple character. Mr. Robinson never sees the sun the whole day long. Here is the camera pointed ready for a panel or promenade portrait, for Mr. Robinson has for some time past introduced this style of picture. "What lens are you using?" we ask. "Dallmeyer's 2A portrait," is the reply; and then, in his bluff characteristic manner, our host adds, "not that I think it's the best; but I've got it."

Mr. Robinson thinks there is a great future for the panel portrait. Already he has albums for them. "I always insist upon angular openings," says Mr. Robinson, in reference to these albums, "and I have great difficulty in getting them." The panel portrait permits the photographer to exercise taste and skill in arranging drapery, and ladies' dresses lend themselves particularly well to the style.

A series of theatrical scenes which Mr. Robinson has just executed were exceedingly good. You saw the whole breadth of the stage, which was bordered in excellent taste with ferns and flowers, out of which grew the footlights. The pictures presented certain episodes in play and farce, and the action and expression of the players were capital. Here is a party of six at one of those scrambling untidy dinners, inherent to the "screaming farce;" here a drawing-room, with two ladies tête-a-tête; here a verandah looking on the briny ocean, with a lady evidently in hysterics, and a nervous gentleman at his wits' end to soothe her. What Mr. Robinson does, he certainly does well. The series, which numbers upwards of a score, were secured upon gelatine plates, but Mr. Robinson gives all the credit of their success to an able stage manager. Be this as it may, they are certainly the funniest, as they are the most perfect, theatrical representations we have seen reproduced by photography.

We must not forget to say a word upon the subject of carbons on opal, apparently the most delicate form of photographic portraiture produced by the method which Mr. J. R. Sawyer has given with considerable detail in these pages. Nor must we omit to mention the beautiful photographic enamels for which the Great Hall Studio has been famous for some years past. We see that the prices asked for enamels vary from fifteen shillings to three guineas.

The whole of Mr. Robinson's establishment, so far as the public is concerned, is on the ground floor. The reception room opens into a small gallery, fresh and green with ferns, out of which lead the dressing rooms, while further on is the studio. Children's portraits, as we have remarked, is what Mr. Robinson delights in, and everywhere these laugh at you from the walls, or coyly peep from the corners. As we gave a last look round at these happy faces, we could not help thinking what a world of good the misanthrope would derive from a contemplation of them all.

A good test of the quality of a man's productions (on the principle that a thing is worth what it will fetch) is the price he gets for them. Mr. Robinson continues to maintain respectable and "professional" charges, notwithstanding what many people would consider severe competition, for there is a host of photographers in Tunbridge Wells, and of all degrees. But

cheap photography does not really injure the heads of the profession; the public have become appreciative, and know that good work can only be got for a good equivalent in love or money. At the same time there is this difference between a true artist, like Mr. Robinson, and the ordinary commercial photographer—the latter must make a profit on everything, the former spares no trouble or expense to get the best results. He says it pays in the end, and we believe him.

MR. ALDERMAN MAYALL AT KING'S ROAD, BRIGHTON.

“THE 9th of January, 1840,” said Mr. Mayall. We had asked our host the date of his first handling a Daguerreotype, and this was his reply. “You know Goddard suggested the employment of bromine in 1840 in conjunction with iodine for sensitizing the silver plate; well, although I was one of the first to employ bromo-iodide of silver, I practised the slower process with iodine alone, when I began photography.” Mr. Mayall came to England in 1845, and then commenced that war between him and Mr. Beard on the subject of the Daguerreotype patent. The process had been improved, added to, and modified so much since the patent was granted, that it could scarcely be deemed the same thing. In 1851 Mr. Mayall made his great *coup*, and his pictures of the International Exhibition, which many of our readers have seen, brought him at once to the front rank. The Prince Consort was especially kind, and took Mr. Mayall by the hand, consulting him now and again upon the rapid strides which photography began to take. When it was suggested, in 1855, to Lord Panmure that the camera might be made a useful observer upon the field of battle, it was to Mr. Mayall our military authorities turned for advice. Two young officers, Ensign Brandon and Ensign Dawson, were selected to perform the duty of military photographers, and these were ordered to report themselves to Mr. Mayall for instruction. So spiritedly did everybody enter into the work, that within a month these officers had been tutored and equipped for duty, and despatched to Sebastopol. The pictures sent home by the young military photographers are still to be found in the archives of the War

Office, together with the fine prints secured at the Crimea by Roger Fenton and Robertson.

On the occasion of the wedding of the Prince and Princess of Wales, Mr. Mayall accomplished a feat which, eighteen years ago, made considerable stir among photographers. He was commanded by Her Majesty to proceed to Windsor to take a series of pictures of the Royal pair, of the bridesmaids, and other illustrious visitors. The command reached him about forty-eight hours before the time fixed for the wedding, and how he was to make arrangements for so much work was a problem not easy to solve. There was no corridor or conservatory at Windsor suitable for the purpose, and all the authorities could offer him, in reply to his telegram, was a canvas marquee. Bridal dresses of glaring white are at all times difficult subjects for the camera, and to photograph a score or two of them in a marquee, and photograph them well, was a task only to be contemplated by a strong man. In a frame of mind less complacent than his wont, Mr. Mayall was hunting in a hansom cab along the Euston Road, to get together, as speedily as possible, the numerous requisites for his responsible task—for heirs to the throne are not married every day—when he caught sight, in one of the long front gardens of that thoroughfare, of a spacious glass house for sale, with the notice, "Can be erected anywhere." The cab was stopped, the builder called, and the price asked. "I'll purchase," said Mr. Mayall, "if you will pull it to pieces and set it up for me at Windsor by ten to-morrow morning." The builder was an enterprising man, and, learning its object, at once caught the bridal infection, and gave his hand on the bargain.

We sat in that glass house, now a trim little conservatory, not so long ago, and, amid scarlet pelargoniums and purple heliotropes, and in a dewy atmosphere redolent with perfume, Mr. Mayall told us its history; for after the structure had done duty so well at Windsor, our host carried it off with him to make an adjunct to his own dwelling. The series of bridal pictures of the Prince and Princess of Wales and bridesmaids taken by Mr. Mayall on that occasion are historical, and need no comment on our part, and, from their popularity and wide-spread publication, it can readily be imagined that the photographs brought their producer some profit; but there are few who guess the extent of the sum that actually was realised.

We have shown that Mr. Mayall is intimately connected with

the history of photography; but there is one other reason why you cannot set foot into his studio without thinking of "old times." There is, probably, no other photographer who possesses such an extensive collection of negatives of bye-gone celebrities. Here is the Prince Consort, quiet and dignified; here, two tough Chancellors of the old school—Lord Lyndhurst and Lord Brougham; on another wall there is Kossuth, and further on Lord Palmerston, Marshal Pelissier, the late Lord Derby, and Earl Russell, Sir J. Herschell, Sir David Brewster—nay, even a picture of Daguerre himself is to be espied in a corner. The value of some of these negatives is very great, and here is a wrinkle we may mention out of hand, which our readers will do well to make a note of. You can hardly keep a stock of glass negatives a quarter of a century, especially if you print much from them, without running some risk, and with the best care in the world they occasionally get cracked and broken. Of Mr. Mayall's costly collection there are some in this condition, but still, strange to say, the prints exhibit no sign of the defect. And for this reason; all cracked negatives are printed by themselves, and in a singularly ingenious manner. There is a simple roasting-jack on the printing roof, and from it depend four cords holding up a square board by its corners. When the jack is wound up, this board revolves first one way, and then the other, and cracked negatives laid upon it to print, leave no record behind them of the defect. For vignette printing, whether cotton wool or glass masks are used, this mode of proceeding should be very valuable, and we commend it strongly to our readers. A jack may be purchased for a few shillings, and does not require to be wound up more than four times an hour.*

To Mr. Mayall's manager at Brighton we have to tender our best thanks for all we saw in the way of practical working. "This is one of our studios," said the manager, as we ascended to the first floor. We looked in. It was a spacious drawing room with two windows, with couch, table, and mantelpiece within eight or ten feet from the light. That there should be no deception, he insisted on posing us upon the sofa, and taking a portrait forthwith. "I am employing a landscape

* Mr. Tulley has commented on the utility of the roasting-jack in a similar connection.

lens, and I am not sure of the sensitiveness of these plates, as they are some of a batch I made last night, so I shall stop down, and give you fifteen seconds." And in less time than it takes to write, a drawing-room picture was secured. A white screen, placed on the shadow side to reflect back the light from the windows, was the only adjustment necessary.

"In making gelatine emulsion," said our friend, "I always prepare four or five small batches rather than one large one. I then test, and, as they turn out in sensitiveness, I mix. A batch that shows tendency to fog is cured of the evil by mixing with a comparatively insensitive batch, and so on. I always test with a landscape lens well stopped down, for it is only by means of a long exposure that you can thoroughly get at the qualities of your emulsion."

We went upstairs to the ordinary studios. They are three in number. "Sitters for portraits are requested to place themselves as much as possible in the hands of the artist," is a notice conspicuously placed. A feature of these studios is the cameras. They are all fixed upon heavy cast-iron stands, and stand and camera are never severed. The stands, though heavy, being upon small wheels, may be moved smoothly and with ease. On no account are cameras to be dismounted, is one of the rules of the establishment. The lenses are very carefully hooded, and, moreover, the end of the glass-room at which they are worked is very dark. But how, it will be asked, if one end of the room is always dark, can a sitter be depicted from one side or other of his face, as may seem desirable? Mr. Mayall gets over the difficulty in a very simple fashion. His studio rises right above the Brighton houses, and, on one side, faces the sea; there is consequently plenty of light. Two of the studios are built parallel, and only divided from one another by a heavy tapestry curtain. In the one you have a westerly light; lift the curtain and walk into the adjoining room, and the light is easterly. The third studio has northerly lighting, and in this there is an arrangement for darkening the room in a few seconds. Sitters are always pleased to see their portraits life-size, and, by the aid of this darkening arrangement and a solar camera let into the wall, they may be at once gratified in this respect. From the circumstance that the Mayall establishment produces a large number of enlargements, we may well presume that this ingenious contrivance is not without some influence upon visitors.

Of lenses, Mr. Mayall has a battery—or shall we say a park?—for the huge instruments remind one very much of artillery, their calibre is so big. The condenser of the solar camera measures no less than 24 inches. Here is a triplet of Dallmeyer's; it is eighteen inches in length and six inches in diameter. Next to it lies a shining instrument of Voigtlander, with a calibre of no less than nine inches, together with another of seven, and a monster by Ross that actually measures ten inches across. This last magnificent instrument has upon the face of it markings like drops of water; they are the effects of a heavy hammer wielded by one who, in a temporary fit of madness, essayed to demolish this lens out of sheer wantonness. How well the hard glass resisted the ill-treatment is really marvellous, and, strange to say, the markings have no effect upon the lens as an optical instrument.

There are few curtains and screens in the studios. The curtains above are of blue linen simply stretched upon wires three feet apart, the curtains being brought over, or pulled back, by means of a pole—a simple and effective arrangement that never gets out of order. There are some bits of tapestry, for employment as backgrounds, but the most striking of these was one of an exceedingly novel character. It rose some eight feet high, and was constructed of jointed or ribbed wood, or, more properly speaking, of laths standing upright. It could thus be made to assume various forms—a semi-circle round the model, a recess, and consequently shadow, to his left or right, or, if necessary, a column might be shaped at one side by bending the plastic screen suitably. The covering of this background was of grey cloth, which, naturally enough, was rendered dark or light, according as it was put into the shade or not.

The terms at Mr. Mayall's establishment are not high, for Brighton is a cosmopolitan town, and all tastes have to be satisfied. A dozen cartes are charged fifteen shillings, and eighteen one guinea, while for a group of two, half as much again is demanded. For a guinea you have six cabinets, and twelve for a guinea-and-a-half.

MR. JABEZ HUGHES AT REGINA HOUSE, RYDE.

THE "regal establishment" of Mr. Hughes, its square white tower rising above the green trees of Ryde, is not unknown to some of our readers. The prominent site and elegant construction—a pile of Portland stone and pale brickwork—standing, as it were, on a pedestal in the middle of a bright little town, tell much for the position and emoluments of photography now-a-days; and approaching from the pier, one hardly knows which to admire more, the straight lofty fabric, or the idea of choosing such a beautiful spot as Ryde for its construction. The studio is built at the top of the green fringed hill upon which the town stands, and in consequence Mr. Jabez Hughes enjoys the unalloyed satisfaction that his light cannot be interfered with.

There is surely no credit in making pictures in such a pretty spot, and we tell Mr. Hughes so. Look at those garden-bordered quays, and the sunlit waves dotted with yacht-sails that drive like snow-flakes over the blue water; see the delicate rigging of that big ironclad, the *Hercules*, running down the Solent on her way to Portland to join the Channel Fleet, and far-off Osborne Point, covered with yellow-green foliage that seems to dip down to the water's edge. From here you can just see the twin towers of Osborne House rising above the woodland slope. Now turn round and look across over the strait to Portsmouth town, that lies lit up in the sunshine yonder, between the low grim batteries by the harbour; and look, too, at the brown hills beyond, with great niches of white where the chalk quarries are. Glance your eye right and left at the azure sea, and the tiny black forts jutting out of the water like "beauty spots" upon the face of a blue-eyed belle. The Queen's photographer cannot help making beautiful pictures under such influences, we say, though 'tis true we once did hear of another reason why good photographs are taken at Ryde; it was given us by a mutual friend—no other than Mr. Toole, the comedian—and he told us it was because they got *Hughes* to it.

We walk up the street to the studio in company with our host, and enter the handsome reception room. Here is something of which the owner of Regina House may feel even more proud than of anything we have yet noticed. Every carte and cabinet picture is printed in carbon. Permanent pigments have ousted silver ones in Mr. Hughes' establishment, and the countless pic-

tures in the show cases are all of them carbon prints. We believe Mr. Hughes is alone in being able to make the proud statement that here appears: "Every portrait is produced in permanent photography, and will never fade."

Mr. Hughes prints by a chromotype process of his own—if chromotype it can be called, when the prints are produced unglazed, and without a margin. In other words, the negative is not reversed, but printed upon carbon tissue, which is developed on collodionised glass. The opal plate is simply rubbed with French chalk before the collodion is applied, and then there is no difficulty about separating the latter when it comes to the transfer process. In the end, the glaze upon the surface is removed with moisture, and in this way carbon prints are secured quite equal, apparently, to those by the single transfer method.

"I have said I always employ permanent pigments in general work," said Mr. Hughes; "but that is not strictly true. I do print from my negatives with the fleeting silver process, but only the unfixed proofs supplied for approval. I may say, therefore, that I utilize in their proper sphere the fading as well as the permanent process." Mr. Hughes turns this preliminary printing in silver to further account, for it affords him a valuable criterion of the density of his negatives. He employs Durand's paper, which is very uniformly sensitive, and he knows that his carbon tissue will require just one-third the amount of printing that is necessary for albumenized paper. While on the subject of printing, Mr. Hughes also said a good word for platinotype, which he employs for special work, the results of which he likened in character to prints upon fine salted paper.

As to reticulation? we asked. Mr. Hughes would admit that he was sometimes troubled with this defect, but not frequently. There were two kinds, he said; one of a mechanical nature, which arose possibly from a tenderness of the gelatine, and which could, with care, be kept under control, the use of spirit being a very general remedy; the other was due to decomposition, and to cure that was impossible. He preferred keeping his carbon tissue two or three days after sensitizing; the results were then much more uniform and certain.

We have spoken hitherto of the general work, but Mr. Hughes has also a speciality in the shape of his large collodion transfers. Indeed, at Regina House, the usual order of things is reversed. While the small work is all printed in carbon, the large is done

by collodion. Mr. Hughes assured us that for the past twelve years he had taken no portrait negative bigger than a cabinet; if larger pictures are desired, these are invariably produced by the collodion process. The upper studio at Regina House contains little else but enlarging cameras for this kind of work. There cannot be a simpler enlarging process, argued our host; the negative is simply placed in the camera, and an enlarged positive is taken, which is toned and worked up as required. In other processes you have a transparency to prepare and work up; from that you produce a negative, which must also be worked up; and, finally, when you have secured your prints, these have to be worked up into the bargain.

But we have meanwhile progressed no further than the reception room. We now pass on, glancing into the well-appointed dressing-rooms on our way to the forecourt of the glass room, all of which are on the ground floor, with a garden parallel with the studio. It is delightful to linger here, especially this hot summer's day. There are ferns and fresh ivy, and a plashing little fountain among the rockwork and greenery. Some rustic garden seats are at hand, and altogether the cool grotto-like aspect of the place is exceedingly pleasant. But we cannot afford



to lose time, and enter the glass room. The diagram presents a section of the rooms, and will enable us to explain the mode of

lighting. The lower half of the diagram represents the end of the studio on the ground-floor, and the upper, that of the studio above it. The portions indicated by black lines comprise the opaque parts, and the portions indicated by lighter lines represent the glazed parts. In each instance the side-lights are of clear glass, and top-lights of fine corrugated glass, running from end to end of each room. The glass is, in all cases, in very large panes. Those in the roof of the lower studio are 7 ft. 4 in. long by 2 ft. wide, the panes in the side-light being 7 ft. 4 in. long by 6 ft. wide. Those in the roof of the upper studio are 7 ft. 2 in. long by 2 ft. 3 in. wide; and in both rooms there are ready facilities for opening the windows, so as to secure not only ventilation, but the effect of open air lighting uninterrupted by glass. The only blinds required are curtains running on a rod, so as to shut out portions of the side-light when necessary. It will readily be seen that, with such a flood of north light, working is rapid and the arrangement convenient. It is an apartment of handsome dimensions, measuring 35 feet by 20, and it is, moreover, some 18 feet high. Its size is the more striking from the fact that it is unencumbered with furniture. The lighting is north, and, as we see it now, the only illumination that enters is a high side light. Above is an ordinary ceiling, and no skylight at all; but inasmuch as the side wall, after rising some ten feet, slopes inwards towards the ceiling, and this slope is glazed, sufficient light comes in to give a soft, subdued illumination all over the apartment. This upper part of the side wall is covered in with dull glass of a greenish hue, known, we believe, as "Hartley's patent rolled," and in consequence there is no definite top light, as would certainly be the case if clear glass were employed instead. The lower part of this north side of the studio is also glazed, but at present screened with thick curtains, which are withdrawn in part after the sitter has taken his place. The light that enters from above is sufficient to illuminate the model over all; side light is then employed to give a definite effect, to point high lights, and to throw shadows. Not a ray of sunshine ever enters Mr. Hughes' studio, so admirably is it constructed, while, nevertheless, its illumination is so perfect that the most rapid exposures may be given. The full advantage of all this is realised when we remember that there is no puffing and blowing to climb to the top of the house, and no sweltering in a hot glass room when you arrive there, for Mr. Hughes' studio is in no

sense a *glass* room ; everything is cool and quiet, with a pleasant look-out on the garden through the large door-windows. The studio furniture is in every case real. Tables and chairs are of solid oak, while couch and settee, with their mouse-coloured velvet coverings, are worthy of notice, if only because of the excellent carving upon them. In a picture they appear handsome, for the simple reason that they are handsome.

We next visit the dark-rooms, situated behind the studio, the distinguishing feature of which is their great height, for they, too, have an altitude of eighteen feet. Mr. Hughes has himself suffered so much from the effects of photographic vapours and fumes, that he determined, in the construction of Regina House, to make thorough ventilation one of its chief characteristics. A system of hot-water pipes pervades the whole building, and it is only in dining and drawing-rooms that mantel-pieces and chimney-places are to be found. A hundredweight and a half of coal daily suffices, by these means, to warm twenty-five rooms.

We go upstairs to the printing-rooms. The carbon tissue is sensitized here, the strength of the bichromate solution varying from three to five per cent., according to the density of the negative to print. The drying of the tissue is effected in a dark cupboard, from which the air is exhausted from below ; the sheets hang upon laths radiating from a centre, which centre depends from a roasting-jack, and is thus made to revolve. In this way the surfaces of the sheets are exposed freely to the air, and are uniformly dried. Here we see the gelatine process complete—gelatine negatives and gelatine prints under manipulation.

We pass to the upper studio, where collodion transfers are prepared. There is little here to tell. The collodion enlargement is projected on to a screen, the dark-room itself forming the camera, and, after development and fixing, toned with judgment *and* palladium. To judge of the extent of toning, the plate is turned over and examined from the back, for it is from this side, it must be borne in mind, that the print will eventually be viewed. After stripping, the film is usually covered with a bright or a matt varnish, and may then be touched little or much, as circumstances dictate.

We descend to the mounting and retouching rooms, and the negative store-room, where countless plates, each packed in a

paper envelope, are ranged in rows of pigeon-holes. "Billiard-room at Osborne," "Queen's sitting-room," "Drawing-room," we read upon various packages, for every envelope bears outside the name of its negative. Here are the negatives of the Princess Fredrica and her husband, who have just been photographed in bridal attire "by command of Her Majesty," and here, too, are the pictures of Lord Beaconsfield, and of his private secretary, Lord Rowton.

We may mention, in conclusion, the terms at Regina House for cabinet and carte pictures in carbon. The former are charged at the rate of a guinea and a half per dozen, and the latter at eighteen shillings. But Regina House does not make it a practice to issue a printed list of prices.

THE KEW OBSERVATORY.

WHEN George III. was king, and the good old monarch, tired with the affairs of State, betook himself into retirement, he spent a good deal of his time at an observatory he built for himself at Richmond. It was a sort of hermitage, a white block building standing alone in the green vista of park-land and verdure, and in this quiet solitude many hours in the evening of his life were passed. Several fine telescopes were fitted up here for the old king's use, and with a few congenial companions he occupied himself in peering into the heavens and watching the movements of the planets. Some said that the king's intellect was weak, and that this last predilection of his for the moon and the stars was the symptom of a diseased brain; but there was method in his madness, if madness it was, and the scientific men of to-day have much to be thankful for to his Majesty, for he gave them Kew Observatory.

The telescopes and other astronomical instruments are no longer to be found at Kew, and it is now a magnetical and meteorological observatory *par excellence*. The establishment is under the charge of Mr. W. M. Whipple, and a more efficient superintendent it would be difficult to secure. Mr. Whipple's duties, as we shall presently see, are very varied, and when we add, that to a thorough acquaintance with the matters with which he has to deal, he unites considerable tact and an amiable

and courteous disposition towards the numerous scientific and general visitors who call at the Observatory, we have said enough to prove that he is essentially the right man in the right place.

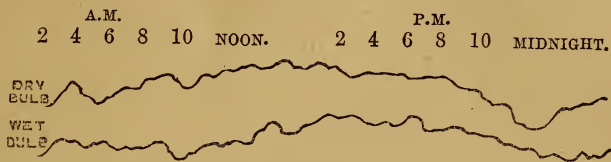
The Observatory is delightfully situated. A few minutes' walk from Richmond station you pass into a large farm, and once through this farm you are in the old Deer Park. A stretch of green meadowland is before you, and more than a mile in front, with a background of verdant foliage, is the white Observatory, the clustering trees of Kew Gardens to your right, with the quaint Pagoda rising high above their branches. The silver Thames is seen here and there on the margin of the grounds, and on the left, among the yellow green boughs of oak and chestnut, is the bridge that spans the river near Richmond. Afar off is a trim lawn that has been turned into a cricket field, and tiny forms in white are rushing about in the sunshine; while close at hand, in deep contrast, is a black spreading cedar, in the shadow of which the brown cattle are lazily feeding.

In no other establishment can better proof be afforded of the aid photography lends to science. The art is here the hand-maiden to half-a-dozen branches of science, and excellently well does it perform yeoman service. Day and night photography notes the temperature of the air, the pressure upon the barometrical column, the electric condition of the atmosphere, and the magnetical disturbances that take place in our mighty earth. A camera is ever busy watching the motion of a pencil of light which moves with every slight meteorological change, thus securing a record valuable to the world at large. Kew is in connection with seven other observatories in Great Britain, and with more than twenty situated throughout the world, and at each and every one of these stations observations go on simultaneously, which are of the utmost importance for comparison. In far-off China an observatory has been established, and Mr. Whipple showed us the first record just received from that distant station.

We will turn our attention to the thermometer first. The photographic record in this case is termed a thermogram, and here is a representation of one.

The upper line is the record of an ordinary thermometer, the lower of a wet bulb thermometer. The zig-zag, as it rises and falls, indicates rise and fall of temperature, and the time of day

is given by the figures above. The exact value of these zig-zags



or curves, in degrees, is at once found by placing over the thermogram a glass plate upon which are engraved certain lines and cross-lines; these lines constitute the key, and show at once the value of a curve half or a quarter of an inch in height.

Now let us look at the instrument in action. We enter a quiet darkened room, in which two shaded lamps are burning. We can see but a portion of the thermometer, but it is just that portion we want to see. It is somewhat different to an ordinary thermometer. The column is of mercury, and there is a little bubble in the column which moves up and down as the temperature varies. The thermometer, therefore, presents a perfectly opaque body, except where the bubble is. Light from a lamp shines upon the instrument, and, as a necessary consequence, the light is seen coming through the bubble as it would through a window. At every change of temperature, therefore, this little spot of light rises and falls. Now the camera comes into play. It is an ordinary lens and camera, except that, instead of a sensitized plate, there is a cylinder, round which sensitized paper is rolled. The back of the camera is opened, and we see a tiny bright spot upon the sensitized paper, the spot representing the bubble of the thermometer. There is a clockwork movement attached to the cylinder, and the sensitized paper thus gradually moves, the pencil of light making its mark the while.

At the end of twenty-four hours, or forty-eight, as the case may be, when the cylinder has made one revolution, the sensitive paper is taken out of the camera, and carried to the developing room, where a zig-zag line or curve is developed, indicative of the rise and fall of temperature during the past twenty-four hours.

The rising and falling of the barometrical column is written down by a camera in something after the same fashion, but we have to descend deep down into the basement to see this camera.

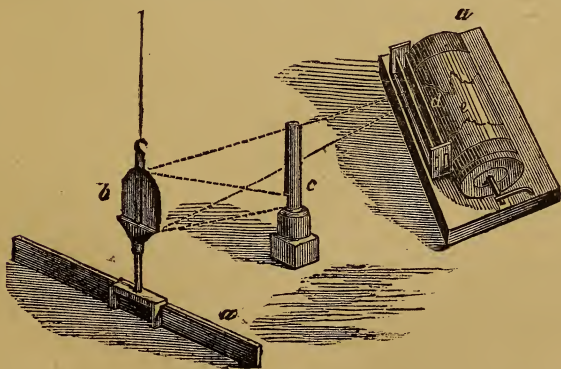
at work, so that the mercury column may be affected as little as possible by variation of temperature. In company with the barograph, in this cellar-like apartment, are three magnetical instruments, with cameras attached. These record the magnetical disturbances of the earth. The light in all these cases is obtained from argand gas-burners, and the moving pencil of rays is sent from a tiny mirror poised upon the magnetic needle. According as the magnets are pivoted, so they tell of the different forces in action—declination-force, horizontal-force, and vertical-force. Magnetical currents, even of a delicate nature, passing through the earth, are not without action upon these delicately-swung magnetic needles, and if the needle is affected in the least degree, the mirror in like manner moves, and thus the pencil of light is moved also. Revolving cylinders, covered with sensitive paper, here also record the movements during the twenty-four hours.

Records of this nature were first made at Kew as far back as 1858, and these were preceded by experiments several years earlier, in the days of Daguerreotype. In 1858, too, Kew first began to take its solar photographs, which have since become so famous. From 1858 until 1871 a photograph of the sun was taken almost daily, and the assistants at the establishment are said to have made no less than 5,000 measurements of sun's spots. As may be supposed, the Kew astronomical photographers possess some experience now in the matter, and they still incline to the use of wet plates for such work. To be of any value, a solar picture must be under-exposed and under-developed (in ordinary photographic parlance), and, moreover, it should not have a sharp disc-like appearance; on the contrary, towards the limb the sun-picture should gradually soften. The Transit of Venus photographs did not prove so successful as they might have been, because they did not comply with these preliminary conditions.

The hours of sunshine during the day are also recorded at Kew. Sunshine, however, only writes itself down when it is strong enough to char paper with the aid of a burning-glass. Sunshine that is at all hazy, or sunshine in the early morning and towards sunset, when it has little power, is not recorded. The instrument is very simple. In order to have a burning-glass that will act all day, a crystal globe is employed, three inches in diameter. This is placed on the roof of the Observatory,

and around, but not touching it, in a sort of bowl, is a blue strip of paper. This paper is in the focus of the globe, and when the sun shines a pencil of light chars the card to the extent of a pin's head. If the sun goes on shining all day, the hot ray of light travels gradually round the interior of the bowl, charring a line upon the paper; if the sun comes out by fits and starts, the burnt line is not continuous, but appears at intervals. At the end of the day, the card strip is removed; it is divided into sections to represent hours, and it is apparent how long and when the sun shone during the day.

We have not time here to refer to the good work done by Mr. Whipple and his assistants at Kew in respect to the testing of barometers and thermometers by the standards that are kept here; but we must just say a word upon the photographic paper that is prepared at the Observatory. The process employed is a modification of the Calotype method, and very similar to that made use of at the Royal Observatory at Greenwich. The paper is of very fine structure, and transparent, so that a second sheet may be rolled upon the cylinder, and a duplicate record secured. It is treated with iodide and bromide of potassium, sensitized on a strong silver bath that contains a little acetic acid. The development is effected slowly by the aid of gallic acid, the sheet being placed upon a glass plate and the developer poured over it, sufficient of the solution being



absorbed for the operation. Sometimes three hours is taken up in development. The only difficulty that occasionally bothers

the observers is the tendency of the paper to blacken, arising, Mr. Whipple believes, from the ozone in the atmosphere.

The late Mr. C. Brooke, F.R.S., was the first to construct a photo-magnetic recording instrument. His principle is shown in annexed cut, in which *a* represents a part of a bar magnet; *b* a concave mirror, resting on a stirrup firmly attached to the suspension apparatus, the whole being supported by a single thread; *c*, an ebonite cylinder wrapped round with photographic paper; *d* a plano-convex lens; *e* a lamp placed a little out of the line which joins the centres of the cylinder and magnet in operation. A pencil of light passes from *e* through a very narrow aperture, diverges and spreads over the mirror *b*, from which it is reflected, and diverges to the lens *d*, and is condensed into a well-defined spot of light at the surface of the paper. The action of the spot upon the photographic paper is to leave a trace, which is, however, imperceptible until subsequently revealed by the application of a developing solution.



MR. ROBERT SLINGSBY AT LINCOLN.

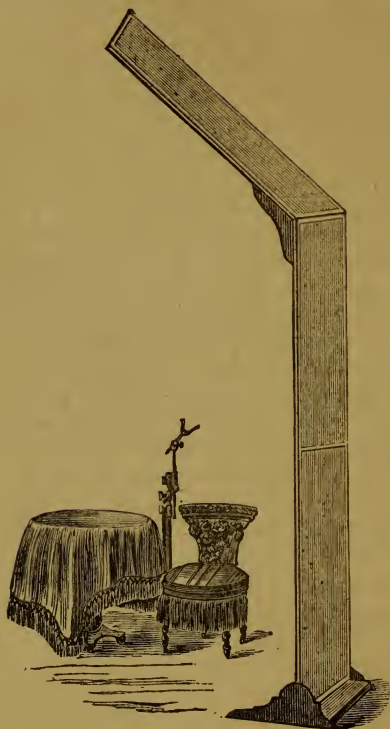
THERE is this difference between photographic studios of England and those on the continent. In the latter, the capitals appear to absorb all the best photographers; in the former, men in the first rank are to be found as well in the provinces as in town. Mr. H. P. Robinson, of Tunbridge Wells; Mr. Jabez Hughes, of Ryde; Mr. J. E. Mayall, at Brighton; and Mr. Slingsby, of Lincoln, are examples of this. Good work steadily makes its way, no matter where it is executed, and if only photographers had the advantage of exhibiting their pictures in public a little more, their claims as artists would soon be undisputed. They will not be long without this advantage, and it may be well to record here the success that has been attained already by a single photograph, with the limited publicity at present at our disposal. We speak of "Alone," a picture that has drawn more criticism, laudatory and hostile, than any yet produced by the camera. When we visited Mr. Slingsby, at Lincoln, he was still busy printing "Alone," and he will apparently be condemned to go on with the

work as long as the negatives last. The composition is well known; a placid sea washes the foot of some white sand-hills, and, in the foreground, alone, is a dainty little lady in summer costume. One hardly knows which to admire most, the rare charms of the maiden, the bright seashore that stretches along the picture, or the smooth hillocks of sand, so fine and silvery that you long to pass it through your fingers. Mr. Slingsby has had no rest since he exhibited that picture on the walls at Pall Mall. It mattered little whether it was produced at Lincoln or Timbuctoo, said Mr. Slingsby to us: "Only one copy has been sold at Lincoln, and that was never paid for." But no picture produced by the camera has ever brought its originator such substantial reward, the sum already paid being more than that fetched by many a clever painting exhibited at the Royal Academy. In the words of an official accountant, we may say that we have examined Mr. Slingsby's books, and find that £450 has already been received on account of "Alone," and the popularity of the picture seems to be increasing rather than on the wane. This fact will be of interest to many, we are sure, if only to prove that an artist can make it pay to do pictures by photography just as well as with brush or crayon.

Mr. Slingsby has established a very good rule with regard to his visitors. He has two studios; they are on the same floor, and divided only by a laboratory. One—the further and larger one—is marked, "Mr. Slingsby's Studio;" the other, "No. 2 studio." In the first, our host himself is to be found; in the other, an assistant rules. In a city like Lincoln there is, naturally enough, a good deal of second-class work to be done, "and there is no reason," says Mr. Slingsby, "why I should send sitters away." Everybody in Lincoln cannot afford to pay high prices; the second studio, therefore, suits a large number of customers, while those who desire the services of Mr. Slingsby himself are, of course, called upon to pay for them. All proofs are sent out untoned. "It has taken several years to educate our customers to untoned prints," says our friend, "but that is now our invariable rule." The advantages of such a rule are so obvious that it is a wonder all photographers do not adopt it.

Panel or promenade portraits are the "new style" in Mr. Slingsby's studio, who has deemed it worth his while to "go in" for a new lens expressly for them—the 3A Dallmeyer, an

instrument that requires an interval of from sixteen to eighteen feet between camera and sitter. The principal studio is built on his own model; it has a northerly aspect, measures forty feet in length, and is glazed with transparent glass. The roof is



steep, the centre being sharply depressed, as if a huge notch had been cut into it, a plan, we believe, that Mr. Slingsby originally patented. In this way rather more front light is thrown upon the sitter, whether he is posed at one end of the room or the other. Mr. Slingsby has an arrangement whereby white linen blinds can be drawn over one part or other of his glass roof; but he prefers to work with large squares of bare glass, and then bring close to the sitter a gauze screen, or, rather, a frame over which fine muslin is stretched. These

screens, which are about three feet broad, take the roof form of the studio; that is to say, they consist of an upright frame about eight feet in height, and another frame above, bending inwards with the line of the roof, measuring another three or four feet. They are obviously very practical, for they can be placed close to or far away from the sitter at will, and thus modify the illumination. Mr. Slingsby believes much in the mobility of screens and backgrounds. The latter he stretches on frames, but does not fix. He prefers to be able to adjust them as he pleases, and, by inclining them slightly towards or against the light, to modify their character. You can get all sorts of backgrounds and accessories, but choosing them is a difficult matter. Photographers frequently overdo it by selecting backgrounds of too florid a character, with far too much park and ornamental waters about them; while accessories—whether balconies, balustrades, columns, or pedestals—appear usually too smooth and finely-finished in the picture. Mr. Slingsby has made a very happy selection, to judge from the subdued results in his pictures, and, although he employs aids of this kind without stint, they have none of that superfine, brand-new appearance which, it may be remembered, was a feature of the Veneering household described in *Our Mutual Friend*.

We need say little of the laboratory, except that it is one of the lightest dark rooms we have ever entered. For the purpose of adapting it to gelatine work, Mr. Slingsby employs a screen made of two thicknesses of deep ruby tissue paper stained with aurine. The hyposulphite bath for fixing is very conveniently stowed away; a handy counter is at the right hand of the window, which serves to rest plates or developing dishes upon; and when a plate is to be fixed, a flap door in this counter is lifted, the plate lowered into the bath, and the trap shut down again. Mr. Slingsby has also several cupboards with drop doors, which are exceedingly handy for putting plates temporarily away from the light in these days of gelatine work. The ordinary table drawer is a very inconvenient thing for a hiding place, as everybody knows. "We must have better means of getting intensity in our plates, though," says Mr. Slingsby, "if we are to work gelatine regularly for portraiture."

In the printing room, among other work, we saw the four big frames required for the printing of "Alone." The negatives are stopped out with ordinary black varnish. No. 1 pressure

frame contains the portrait negative cemented fast to a twenty-four inch glass plate; No. 2 has the foreground similarly cemented down, which really consists of two negatives; No. 3 has the white sandhills; and No. 4 the sky. The last requires the most attention, and is the only one that calls for our host's personal care. "Ready for a change, sir," sings out the printer, when the turn of No. 4 frame comes, and then the delicate task of printing in the sky has to be performed by the principal. It was the foreground of this picture, however, that gave Mr. Slingsby most anxiety when it was taken, for two cart-loads of stones had to be carried to the foot of the sand-hills in order to break the line of the view.



AT SARONY SQUARE, SCARBOROUGH.

A JOURNEY of nearly 500 miles, undertaken for the sole purpose of visiting a studio, is no little matter, even in these days of fast through trains and comfortable carriages; but we may say at the outset that a peep at the Sarony establishment at Scarborough is well worth a few hours' hard travelling. In any case, we fear it would be hopeless to enlist the sympathies of the reader in our behalf; for, after all, a couple of days spent at the queen of watering-places during warm autumn weather, just as the outbursts of sunshine are getting few and far between, and it behoves one to make the most of them, can scarcely be termed a grave hardship. We shall say nothing, therefore, of our swift journey down north, of a two hours' halt at York for dinner, and a peep at the Minster; its massive roof so clearly lit that every trait and niche in the white stone is plainly visible, and its magnificent windows—especially "The Five Sisters of York," endeared to us by Dickens' charming legend—which are among the finest in the world. Nor shall we enlarge on our first glance at Scarborough, as we looked down upon it at night, from the high cliffs, and saw below the glittering lights of the Spa Gardens, the curved quay studded with lanterns, the illuminated bridge and grand hotel opposite, and far away at the further sweep of the bay, the outline of castle and hill dimly visible in the twilight. These and other matters we

must be silent about, if we do not wish the reader's sympathy to turn into absolute envy.

Imagine a well-built square of white houses in a fashionable part of the town. The garden of the square is protected with handsome railings; there are green shrubs and trees in the vicinity of the railings, and, for the rest, a well-kept lawn decked with flower-beds, and intersected with brown gravel walks. In the centre of this garden is the Sarony establishment. It is a solid, oblong building, Grecian in style, and, at a rough guess, 120 feet long. The building is white, with cream-coloured corner stones, and a broad flight of steps at either end of the building form a fitting entrance. We go in by the eastern door—the threshold guarded by a pair of lions rampant—the aspect of the interior being more that of a public establishment than a private one; indeed, as we soon discover, the Sarony Gallery is one of the sights of Scarborough. Visitors may come and go any hour between nine and five; and beyond the many productions of a photographic nature on view, there is, on the floor, a fine collection of paintings, for the most part the work of F. Jones Barker, the painter, it may be remembered, of “The Allied Generals before Sebastopol,” a well-known picture that has been engraved and extensively sold by Messrs. Graves, of Pall Mall. “The Charge of the Light Brigade,” by Mr. Barker, now occupies a post of honour in the Sarony Gallery, and there are other noteworthy paintings and portraits which make the fine hall a point of attraction and fashionable lounge with the visitors to this favoured spa.

But we have, as yet, got no further than the corridor. On the right hand is the business department, where a specimen of every form of portrait may be seen. Here we are met by Mrs. Sarony, who is good enough to give us a hearty welcome, and by Mr. Fisher, one of the managers, in whose company we are to make a round of the premises. Mr. Fisher tells us that the Promenade, or Panel portrait, has taken very firm root at Scarborough, being the favourite picture of the season; and while in the business department, we may mention that the charge made for promenade portraits is one guinea for five plain portraits, or four vignettied and enamelled; for in the Sarony establishment enamelled pictures are still in favour, and sitters readily pay a larger sum for the extra finish imparted by a glaze of gelatine and collodion. Cartes-de-visite are charged six for half-a-guinea, or twenty for a guinea.

We walk along the corridor. On the right, as we proceed, are the reception and waiting rooms. These are magnificent. Handsomely furnished, more after the style of a French salon than an English drawing room, the apartments are the embodiments of good taste and costly elegance. Rich divans and velvet lounges, lofty mirrors and gilded tables, attract the eye on all sides; pictures are on every wall, and one of the salons contains a collection of most exquisite water-colours. Two studios lead out of these reception rooms on the ground floor, and here most of the portraits are taken, for although there are other glass rooms above, the sitter is not troubled to ascend, unless it is absolutely necessary.

We go through the door of one of the salons and enter the studios. They are both lighted from the north. In the middle, where they join, the cameras are placed, and the dark rooms are situated. Thus two sitters, taken at the same time, supposing there were no division between the studios, would be facing one another. In this way, husband and wife can be secured from different aspects, while yet lighted from the north, and an assistant can operate indifferently in one studio or the other without altering the conditions of his working. The studios strike one as very different to those usually met with. They are small, low-roofed, sombre, and cool: and as we look at them, we call to mind the predilection for low studios that has of late years manifested itself, among Berlin photographers especially. In a word, the Sarony studios are the very opposite to what glass rooms usually are. The rooms are painted a French grey, which looks the darker by reason of the absence of height. On the light side, the curtains are drawn from the end of the studio up to a line with the sitter; then comes an area of six or eight feet square of plain glass, usually covered with gauze, while in the rest of the studio, in front of the sitter, the light is exceedingly subdued. At the camera end of the studio it is, indeed, comparatively gloomy, so that the assistants may enter the dark rooms which adjoin (and which serve for both studios) without inconvenience to themselves or the operations they may be conducting. There is provision for top-light, but little use is made of it, the illumination here being kept under control by a sort of Venetian blind arrangement placed horizontally—or nearly so—upon the roof.

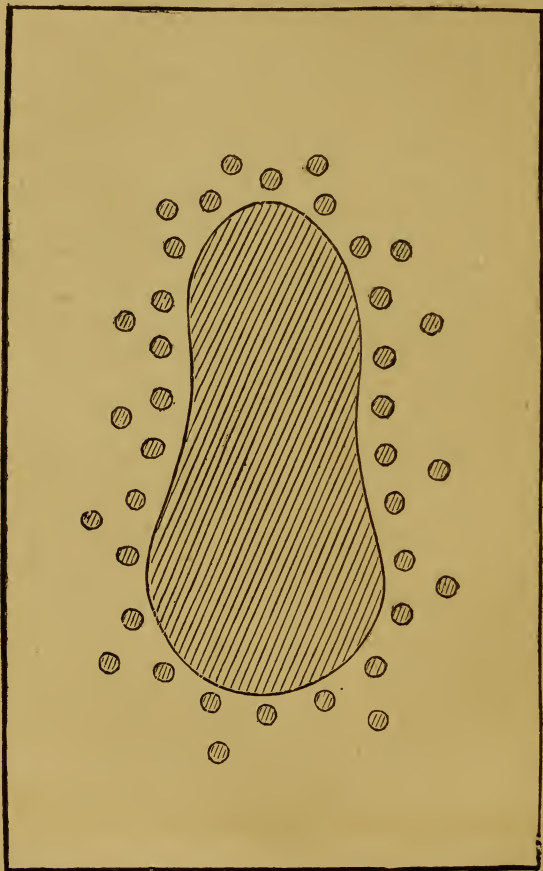
At first sight there is apparently not much room for back-

grounds—they are all Seavey's—in these small studios; but on looking nearer, we find ample provision has been made in this respect. The backgrounds are ingeniously contrived to rise from below, and so well balanced are they, that with one hand you can change the scene without difficulty. The accessories in use are very few, and none, we were glad to see, had that highly-polished, glacé aspect, which is so much in favour with many makers of these articles.

At the entrance we remarked a huge tabular statement of all the rooms in the building, and these we now proceed to visit. In the corridors, on the staircases, and in many of the rooms, the window panes are photographic transparencies, not only of subjects direct from nature, but of paintings, prints, &c., whose appearance is exceedingly attractive. Here, on this floor, is a series of artists' rooms; here is an apartment with rows upon rows of opals in a more or less finished condition; here are the retouching rooms; here enlargements on canvas. At the Sarony establishment all enlargements on canvas are made in silver, and on expressing a desire to see the process in operation, we are forthwith ushered up to the second floor. "The great thing in the preparation of the canvas is to wash with plenty of water," said our guide; "but, of course, it is necessary to remove to the last degree any pigment or preparation that may have previously been applied." As we enter, a canvas is in process of sensitizing. It is resting upon a board, its four corners fixed up with clips, so as to form a tray; it has previously been treated with equal parts of bromide and iodide by way of "salting," and it is now under the action of a thirty-grain solution of nitrate of silver. In its position upon the board the canvas may be handled at will, and presently the bath is poured off, and the fabric, wet as it is, stretched for printing. A Monckhoven enlarging apparatus, sunshine being employed as the illuminating agent, projects a magnified image upon the canvas, and in two minutes the latter is ready for development. It is taken down, placed once more upon the board, the corners clipped as before, and the developer, containing equal parts of citric acid and pyrogallie acid, poured over. The development is complete in about five minutes, and then a solution of salt and water is poured on; the fixing may be at once proceeded with, or may be postponed almost indefinitely, as may seem best.

We now proceed to the basement, where are the workshops,

the negative rooms, the enamelling and printing rooms. Two little points in the printing-room, scarcely very novel, perhaps, are still worth noting. To secure faultless prints from a cracked negative, it is put at the bottom of a narrow box, two feet deep, with blackened sides; a sheet of tissue paper is then dropped upon the face of the printing-frame,



and the box carried out of doors, where, obviously, only parallel rays can reach the plate. This method, according to

Mr. Fisher, is the simplest way of treating cracked negatives, and that it is a perfectly efficient one, we can testify. The other point is the method of vignetting adopted. A very great deal of vignette printing is done, and a quick and effective plan is, therefore, very necessary. It would never do to issue a faulty vignette bearing the name of Sarony. The printing in the summer is all done under frosted glass, and in these circumstances very delicate tones are obtained. The vignette masks are made in a very ready manner; a piece of thin cardboard, the size of the printing-frame, has cut out of it a pear-shaped opening the size of the bust or figure, and round the circumference, or margin, of the opening are punched holes, all of the same size, exactly as shown in our cut (p. 150). If one part of the picture requires to be printed a little more, a few extra holes are here punched in the cardboard. This is then fixed upon the top of the printing-frame, being about half an inch above the negative; and so diffused is the light that passes the mask, and so well is this contrived, that the most delicate gradation is produced without the printer being at the trouble of once moving the frames during printing. With a punch at hand, a vignette mask of this kind is fashioned in a few seconds.

A very highly albumenized paper is employed at the Sarony establishment, and, in reply to a question on our part as to the occurrence of blisters, these, the chief printer told us, were generally found to be due to the employment of too strong a silver solution. The defects usually disappeared on weakening the bath. The washing of the prints is conducted in circular troughs with a syphon arrangement. Messrs. Sarony and Co., of Scarborough, have recently produced a number of large negatives on bromo-gelatine plates measuring 54 by 40 inches, and 30 by 25 inches. Mr. T. G. Whaite, who prepared the plates and produced the negatives, has devised a simple "coater" for large plates consisting of a V-shaped trough, one side of V being thin wood, the other of double muslin, which is coated to within an



eighth of an inch of bottom of V with shellac varnish. Here is a picture of it. The emulsion is supplied to the trough as it is

being drawn over the plate, on which it acts as a brush, "painting" the plate, free from air-bells. Mr. Whaite says, in respect to it: "I find the above coater act admirably, but it must be very light, and easily handled with one hand, hence the necessity of only one side being wood; coating the muslin with shellac prevents too much running out over the plate; in fact, the coater acts much as the stylographic pen—the emulsion is dragged out, as it were, by drawing over the plate."

MR. P. MAITLAND LAWS AT NEWCASTLE-ON-TYNE.

PHOTOGRAPHY BY GASLIGHT.

To visit Newcastle and not to see Mr. Laws' clever arrangement for taking portraits by gaslight would have been a mistake indeed. Perhaps we expected to see more, or perhaps the simplicity of the apparatus surprised us; but in any case, the impression on the mind, after you had been in the studio some minutes, was that you could go out again as soon as you liked, there being nothing to keep you. We once engaged in a terrible struggle of many minutes' duration, we remember, to get a peep at Garibaldi sitting in a carriage drawn up before one of the railway stations, and, hot and breathless, at last succeeded in pushing right into the front rank to look upon the famous patriot. He was bare-headed, and dressed in that well-known grey toga, a sight well worth seeing. But, after all, there was only a human face and some grey cloth to look upon, and you could not go on staring at these simple things for ever. So it was with Mr. Laws' gas apparatus; it seemed so simple, it was hardly worth coming to see. The gas-burner is no novelty, and the dome-shaped reflector inside is of silvered glass like other reflectors; as the Cockney said of St. Peter's at Rome, it is well scooped out, but there's nothing in it.

The apparatus, nevertheless, represents the fruit of much hard work and ingenuity. Mr. Laws set himself a problem, and worked it out by himself. A year ago, taking portraits in the studio by gaslight in the ordinary way of business would have been laughed at as an extravagant idea. Walk into Mr. Laws' studio to-day, and the whole matter is so obvious, you are tempted to declare there is nothing in it at all. There is a gas flame,

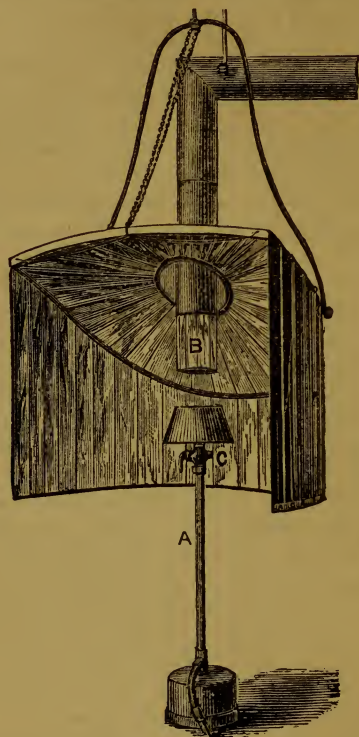
and there is a reflector—*voilà tout !* Mr. Laws might, however, be tempted to say, “Just so; *voilà tout !* a gas flame and a reflector; but no electric light, no gas engine, no Gramme machine, no complicated screens, no pyrotechnic display, no magnesium fumes, no sulphur and chlorate of potash, no puffs and no smoke, no mixing of anything in a mortar or winding up of any clock-work, and, above all, no patent; there is a gas light and there is a reflector, that is all.” Mr. Laws deserves honourable recognition for having devised a plan of artificial illumination that is unsurpassed for efficiency and simplicity.

As to the nature and delicacy of the pictures produced by gas-light, we merely say that they are only second to those taken by the aid of the sun. Any of our readers who are interested would, no doubt, be welcome to an example from Mr. Laws by paying the nominal cost of the print, and we venture to say they will be unable to point out any great difference—if, indeed, any difference at all—between it and pictures taken by daylight. Of course Mr. Laws prefers daylight, like anybody else, and only employs his gas lamp in the winter months and in dull weather. Unfortunately, the public are not of the same mind. “I saw none of your gas-light pictures in the reception room,” we remarked. “No, I have been forced to remove them,” said Mr. Laws; “everybody wanted to be taken by gas-light in the summer time.”

One other remark before we describe the apparatus. The multiple gas flame is rather a large one, and it might be supposed that the Insurance Companies would therefore be inclined to augment the premium; but, notwithstanding the fact that an officer was sent to inspect the studio, no addition was made to Mr. Laws’ charges on account of fire assurance.

On the following page is a sketch of the apparatus, which is placed at the side, and a little in advance of the sitter. We will begin with the burner. From the floor rises an upright pipe or standard, 4 ft. 6 in. high, with burner at the top, A; over the burner is a chimney, the lower portion of which is of mica, B, a material transparent and unaffected by the heat of the flame. There is a tap for turning the gas on and off, C, when the exposure begins and ends; but so that the flame, or rather flames, may not be entirely extinguished, there is a little bye-pipe which may always be left turned on. The burner is one of Wigham’s, and consists of 68 jets, capable of yielding an illuminating power, it

is said, equal to 1,250 standard candles. The shape of the reflector may be said to be that of a Dutch oven, only it is domed instead of angular. It is of galvanised iron, and lined throughout



with strips of silvered glass. The upper concave portion of the reflector supplies top light, the lower parts side and front light. The reflector is suspended from the ceiling by an iron rod, and in such a manner that a slight touch is enough to swing it round and alter its position. The measurement of the reflector across the front is forty inches. When fixed for use, the top of the reflector in front is six feet from the floor, while the back (the reflector has a sloping and rounded roof, it must be borne in mind) is four feet three inches from the floor. In the centre of the roof or the reflector an opening eleven inches in diameter leaves

room for the chimney. The walls of the reflector in front measure forty inches.

A burner and reflector of this kind near the sitter is a little unpleasant, both by reason of the heat and glare that are perceptible; but these disagreeable characteristics are at once shut off by a screen of blue glass that Mr. Laws adjusts to the front of the apparatus, and which is not shown in our cut. It is simply a frame measuring 40 inches by 40, filled up with strips of blue glass. This screen is quite sufficient to remove any unpleasantness, and the sitter, as we ourselves can testify, suffers no more from the light than he would in looking out of window. Strange to say, there is very little actinic power cut off by this blue screen, the exposure of a plate for eight seconds with the screen giving as good an image as one exposed for seven seconds without it. Eight seconds is the time fixed for a carte portrait with the extra sensitive gelatine plates of Mr. Swan, who has from the commencement taken great interest in Mr. Laws' work, and seconded his efforts in many ways. For cabinet portraits, twelve to fifteen seconds amply suffice.

Mr. Laws told us that Messrs. Edmondson, of London and Dublin, have inspected his reflector, and are in a position to make others of a similar nature; but, as our readers will observe, there is nothing particularly difficult in the way of constructing the apparatus. Mr. Laws has tried naphthalising his gas in order to increase its brilliancy, but the results of his experiments in this direction show that there is little if anything to be gained by such means. We may mention, by the way, that according to the Act of Parliament, gas supplied in London should have an illuminating power of not less than sixteen sperm candles, employing a standard burner, and further, that per 100 cubic feet there should not be more than ten to twenty grains of sulphur, and not more than five to ten grains of ammonia. But in the provinces the standard is scarcely so good.

Mr. Laws speaks highly of gelatine plates for ordinary studio work. He has employed the silver bath scarcely at all, and does all his daily work with dry plates. He employs the oxalate developer, made up according to Eder's simple formula, and makes it a rule to expose no more than two plates on every sitter, so familiar has he become with their qualities.

MESSRS. BROWN, BARNES, & BELL AT LIVERPOOL.

THERE was no reason to go all the way to Liverpool to visit a studio of Messrs. Brown, Barnes, and Bell, for London contains two of their establishments, and there are a round dozen of others in the principal towns of Great Britain; but it is at Liverpool that the firm is "at home," and to Liverpool we accordingly journeyed. Even at Liverpool we did not visit the whole of the premises occupied by the firm. We were, we frankly admit, only at the principal studio in Bold Street, and at the principal printing and mounting establishment in Mount Pleasant; but it will be difficult, nevertheless, within the space of this article, to give an adequate account of what we did see of the doings of this enterprising triumvirate of photographers.

We have inspected a good many studios, both in this country and abroad, but, as a photographic establishment which does not publish work, that of Messrs. Brown, Barnes, and Bell is by far the biggest that has come under our observation. We counted a score of employés in the printing department alone, all engaged upon solar printing, and in the mounting and spotting branch the hands were more numerous still, the former work being undertaken by men and boys, and the latter by women and girls. In the toning-rooms, an average of 2,000 impressions pass into the bath daily; in the sensitizing-room, from 130 to 150 sheets of paper are floated every day.

"We may not go in for the very highest class of work," said Mr. B., one of the members of the firm; "our motto is, 'Go ahead,' and we do go ahead as much as we can. The London branches do their own printing and finishing; but Glasgow, Birmingham, Edinbro', Manchester, Leeds, Bradford, Wigan, Henley, Southport, Bootle, Nottingham, and Newcastle, all send their negatives to us at Liverpool."

In short, the firm's object is to cater for the million, and not for the few; their ambition is to do good work of a good class, and at a moderate cost. Here are the prices:—Twelve cartes-de-visite, 7s. 6d., or if vignetted, then only half-a-dozen are given for this sum. Cabinets are 15s. 6d. the half-dozen, and one guinea the dozen. "Photographs to be paid for at the time of sitting," is the universal rule. On approval, the negative, together with the order, are sent to head-quarters to be dealt with.

The first proof from every plate is pasted on a sheet of paper, or printed schedule, which is filled in with the necessary particulars, and the colour of this sheet, whether yellow, blue, red, orange, &c., indicates the locality from which the photograph has been received. Obviously, it is only by adopting a most business-like system, that so vast and intricate an establishment could be organized and kept going; and when we mention that not only portraiture, but all sorts of miscellaneous work, is likewise undertaken by the enterprising Liverpool firm, it must be a good system indeed to work without a hitch.

The head-quarters office is at Bold Street. We pass by a fine collection of photographs, in which the new panel or promenade pictures are conspicuous, and walk upstairs. The firm desires that we should see something of what they propose to do in the future, before we proceed on our visiting round. *Imprimis*, there is a handsome folio volume to admire, "The Pictorial Relics of Ancient Liverpool." Fine paper and bold type are seen in conjunction with some exquisite, rare reproductions of sketches made half-a-century ago and more, of Liverpool. The sketches—seventy-two in number—were collected from many portfolios, their owners placing the pictures freely at the disposal of the firm, who were thus enabled to produce the magnificent volume before us. "It's not bad for a provincial production," said Mr. B., in reply to our encomiums, and, indeed, Liverpool is fortunate in possessing such "pictorial relics." When will London have such a volume, we wonder?

Here is something else equally attractive. Milled note-paper has been popular, but people are getting tired of it; so Messrs. Brown, Barnes, and Bell propose to impart to letter writing a further charm. Here are half-a-dozen designs—pieces of cardboard some twenty inches high—which may be regarded as magnified sheets of note-paper. Upon each sheet is an elegant linear design in Indian-ink; there are, perhaps, a score of parallel lines down the page, to aid in writing straight, and at the margin are scrolls, and crests, and water-lilies, &c., &c., finished also in Indian-ink. These designs will be photographed, and a block prepared by the Woodburytype process, or, rather, by a modification of it, which is familiar to many of our readers, under the name of photo-filigrain. With this block note-paper will be embossed, and the result will be sheets with a delicate water-mark design and a slightly embossed surface. There is

this material difference, however, between the ordinary water mark and that imparted by Mr. Woodbury's ingenious process: in the former the markings are formed by lines uniformly transparent and of considerable thickness. The photo-filigrain process, on the other hand, not only permits the formation of very fine lines, but will reproduce half-tones as well, if these were present in the original design.

Another obvious advantage is cheapness. To make a fine design for water-marking is very costly, fifty to a hundred pounds being sometimes spent upon it; to practise photo-filigrain, you may take your design whence you choose. Whatever the camera reproduces can be adopted as a design. Our host, Mr. B., indeed, hopes soon to be able to say to photographers, "Send us an impression of any portrait negative upon the sensitive tissue we forward you, between folds of yellow paper; we will then supply you with a quire or more of note-paper, in which your portrait shall be exhibited as a water-mark." The Liverpool firm, in a word, propose to make a clever use of a clever process.

We have little time to speak, as we should, of the efforts Messrs. Brown, Barnes, and Bell are making in conjunction with Mr. Woodbury to supersede engraving on wood or steel. In Paris, as our readers are aware, the firm of Goupil et Cie. have already out-distanced all others in the success that has attended their efforts in this direction, and there are now to be seen mechanical portraits that cause us to rub our eyes, and doubt whether it is photography or a true engraving we are looking at. The Liverpool firm is a competitor in the same race, but at present their efforts are more particularly directed towards turning a draughtsman's sketch into a type-block for printing. A French publication—"La Vie Moderne"—already exists, which employs the camera to translate its sketches; but these newspaper illustrations are capable of considerable improvement. It is indispensable to have a grain throughout the picture in a process of this kind, and one of the most successful plans that has been tried in Liverpool is to make the sketch upon a paper over which a network of black lines has been traced, the veil-like markings having a close likeness to that borne by reticulated tissue. Upon this black-veiled paper an artist sketches in crayons; wherever his point touches, a black line results, covering up the network, the result being a drawing of a some-

what degraded character, since there are no high-lights. To get these he employs an eraser, or the point of a knife, which scrapes away the black veil, and thus lays the white surface bare. Therefore, in the end, the picture is made up of three gradations, if we may so term them: bare white paper for the high-lights, the net-work for the middle tints, and black crayon lines, more or less close, for the shadows. Of this sketch a photograph is taken on the Woodbury tissue, which, by washing, is made into a mould, and from this mould a plaster cast is secured. It is then a comparatively easy matter to get a type-block from the plaster cast.

At Bold Street, there may be said to be three reception rooms, one above the other, on the ground, first, and second floor; so that, if there are many customers waiting, this circumstance is not rendered too obvious to the last comer, who might be frightened away if he saw the full extent of the *queue*. But the rooms are not only elegantly and comfortably fitted up; they are so full of interesting pictures, that half-an-hour is quickly spent within their walls. Collodion enlargements on opal, collodion transfers, and carbon prints are here in profusion—some perfectly untouched, others more or less highly finished in oil, and black-and-white, to suit all tastes and all purses. Here is a charming enlargement—two tiny sailor boys perched aloft on the truck of the main mast among the rigging, with a clear-lit sea behind them. In the studio presently, we see the “accessory” that has been here employed, an object of a very simple character, which is placed in front of a sea background, the seat being some five feet from the ground, so as to give the effect of height. Not far off is another picture of interest—the portrait of a rough gold-digger in a Californian landscape. “He came to us,” said Mr. B., “with a yellow, stereoscopic picture, showing the spot where he made his fortune, and the wooden shanty in which he had lived during the making of it. ‘Here’s my diggings, and here am I myself; now, can’t you make a portrait of me, and put me alongside the old place?’” The Californian’s wish was gratified, and the picture before us tells how successfully the *tour de force* was accomplished.

These are legal pictures. Here is a substantially-built house, with two tumble-down cottages beside it. The owner of the house heard that his friends next door were about to pull down the adjoining premises, and build them up again on a finer

scale ; there was talk of a lofty establishment that bade fair to obscure the light of the house-owner, so the latter conceived the happy idea of having the old buildings photographed forthwith, as they stood, so that, in case of a law dispute about "ancient lights," good evidence should be forthcoming as to the actual height of the old dwellings. Another illustration. The nose of a ship has been damaged, and, while it is lying in the dry dock, a photograph is taken to record the extent of the injury. It is the result of a collision, and there will probably be a dispute as to the amount to be made good. "This is the birth-place of Gladstone, in Rodney Street," said Mr. B. "An old lady living there objected to our taking the photograph ; we told her Mr. Gladstone was public property, and we should do as we liked. However, she was perfectly satisfied in the end, when we presented her with a copy of the picture." There are, by the way, many fine pictures, on a large scale, of private residences, and we doubt whether there are many photographers who are so alive to the turning of an honest penny in this branch of business as Messrs. Brown, Barnes, and Bell.

We go across to the printing and mounting establishment, having first announced our coming through the telephone. Nearly a hundred people are here employed, and Mr. B. tells us the number of employ  s and families dependent on the firm are scarcely less than one thousand. Think of that, all you who despair of getting a livelihood out of photography ! Here are store-rooms for incoming and outgoing packages ; here is the frame-makers' department, in which frames of all sizes are turned out by the gross, the firm's business in club enlargements being especially great. Farther on are the toning rooms ; lime toning only is employed, and in washing, toning, and fixing, the utensils employed are all of slate. In Mr. B.'s opinion there is not a cheaper and better material for the purpose than enamelled slate. The slabs are screwed together, and the joints made tight with white lead. The water in the bath remains clear and cool, and a utensil, two feet square, costs but twenty shillings.

The outhouses and yard devoted to printing present a very busy scene. In the open, upright screens secure shadow ; but there are conveniences for printing under any conditions. You can easily tell the dry plates from the wet when they are in the frames ; the former are black, the latter white. "You don't like dry negatives, Mr. Oliver, do you ?" says our host ; and

Mr. Oliver, who has had charge of the printing arrangements for the past fifteen years, replies most emphatically that he don't.

We go upstairs, moving from room to room. Sensitizing, mounting, touching, and painting are busily going on. From the first floor we go to the second, and from the second into the roof, where the collodion enlargements are made. There is just as much bustle up here as down below. Coating, sensitizing, and stripping are going on in a series of laboratories, and close by is the enlarging-room. An opening in the roof receives the small negative, under this is the lens, and a table below receives the sensitized collodion plate. No sunlight is employed, but direct rays from the sky, and, under these circumstances, an enlargement is secured in ten seconds. There is no dark-slide, the room being sufficiently gloomy to prevent the film taking harm when it is carried about; the negative is adjusted and focussed, and then the sensitized opal plate is brought from the bath, and laid on the table, upon which the enlarged image falls. After an exposure of ten seconds, the plate is taken up and developed. A hundred collodion enlargements a day are sometimes made in these laboratories.

M. LAFOSSE AT KNOLL'S HOUSE, MANCHESTER.

DELIGHTFULLY situated in its own grounds at Higher Broughton, above the vapours of murky Manchester, is a quaintly built villa of black oak, a bit of mediæval architecture that seems to have been forgotten by the modern builders, who have been so busy planting their bricks and stucco around. It is Knoll's House, and, posed on its terrace-like pedestal, it appears all the brighter and more pleasing by reason of its contrast to the solemn square edifices in the neighbourhood. The gable roof and shining black beams are charmingly picturesque, and as the building lies back at some distance from the road, there are quietude and repose to still further enhance its beauty.

The interior is no less pleasing. An oak passage, somewhat low and sombre, with shining casques of steel and polished breast-plates on either side, leads to a panelled room in which there is much exquisite carving. Here everything is in good taste and keeping with the structure. The furniture is all of black oak,

and on the massive sideboard are tankards and platters of burnished silver. The fireplace is of mediæval design, and the settees and curtains have an air of the tapestry age about them. To be brief, in the construction of Knoll's House, every bit of Old Manchester that could be collected together by its builder was made use of, and the experiment, a risky one, has yielded a very happy result. It is only the oak room and hall, however, that possess an old-fashioned air. The rest of the rooms have lofty ceilings and modern furniture, although in the handsome gallery or reception room there are also much antique work and rare carving to admire.

M. Lafosse has a business establishment in the town of Manchester itself, and it is only the higher class camera work that is executed at Knoll's House. M. Lafosse's name stands so high as an artist that we need not speak here of the merits of his pictures; he executes large numbers of cabinets, for which he possesses a wide reputation, while in respect to club portraits on opal—to take another branch of work—they are produced upon so large a scale that M. Lafosse actually employs a staff of framers on the premises.

A courtyard separates the house from the working departments, the studios being again connected by a passage with the front entrance. We cross the yard, and M. Lafosse points out where his large groups are taken. There are a rustic bench and two or three chairs upon a platform, the boarded background being painted of a greyish tone, and trained with imitation ivy. "After two o'clock I can do anything I please there; I know my effects as well as in the studio indoors." We pass on into the framing room. "Here are the cheap club portraits we were talking about just now; our charge, finished in colours, is thirty-five shillings, or two guineas in black and white." The pictures are all upon opal, the latter being simply albumenised, coated with collodion, and sensitized in the ordinary way. In reply to a question as to toning, M. Lafosse says: "The tint is so satisfactory after development that we never tone."

We enter the printing room. It is a model of construction and ingenuity. It is an oblong apartment, and, as a matter of course, not very light. Along the length of the room runs a dresser or bench, upon which the pressure-frames are stood for changing. In front of the printers are large roof-like windows, and the frames, put upon a sliding tray, may be either pushed forward

under these windows, or farther still into the open air for printing. There are six of these sliding trays, measuring some five feet broad, all of which in turn are drawn in upon the dresser, to change the frames; and according as the tray is pushed out again into the light much or little, so the printing proceeds quickly or slowly. Conveniently situated behind the printers is the darker sensitizing room, whence fresh supplies of paper are drawn, and also the negative store room, so that the employées have all necessary to do their work conveniently to hand, and the operations proceed smoothly and uninterruptedly. The negative room has racks for 14,000 negatives, each pigeon-hole containing ten plates; hence the numbering is at once plain and straightforward. M. Lafosse is never troubled with rising of the film; he employs both Hubbard's and the Autotype varnish.

There are two fine glass rooms at Knoll's House, at right angles to one another. Our kindly host insists upon taking a portrait, so we sit down. When the picture is taken, however, we scarcely know, for there is such a humorous rattle the whole time, and all sorts of conjuring going on with a fan, and anecdotes about past sitters and present ones, that by the time we begin to compose ourselves, he says it is all over. M. Lafosse is of opinion that French photographers are certainly not ahead of those in England now-a-days. "But Paris photographers have many advantages—that is a nice little fan, isn't it?—you see their models pose so much better than you English people do—that's a capital smile!—and then they dress so much better. Here you have people who don't know how to dress at all; they come arrayed in glaring satin or a nasty shiny grey, like that you are wearing—capital laugh that; just keep it on—thank you."

M. Lafosse's principal studio, which is about fifty feet long, is tinted a dark grey-green. There is a skirting-board at the light side eighteen inches from the ground; then three feet of ground-glass, and above that, sloping inwards, three feet of clear glass. All or any portion of the ground-glass may be shut out by opaque sliding screens, and there is a very ingenious arrangement for modifying the top side light that comes through the clear glass. A row of small white screens hang down from the roof, and in this position do not obscure the glass. But if sloped to the right or left—and by means of a frame-work they all move together—the light is reflected on to or away from the sitter, or, by pulling taut the glass, obscured altogether. The

screens, indeed, are constructed something after the manner of a Venetian blind. The studio contains a vast number of clever properties, but the best of all is a large musical box, which M. Lafosse finds exceedingly useful when making exposures, as sitters then have something else besides themselves to think about at the eventful moment.

In working, M. Lafosse believes it well to make up collodion and silver bath in batches. For instance, he makes up one hundred ounces of nitrate of silver into bath, and mixes up at the same time as much collodion as he is likely to require for the same. When these are expended, he prepares fresh supplies. In the same way he albumenises a hundred or a thousand plates at a time, for M. Lafosse invariably employs an albumen substratum both for ordinary work and for his opal enlargements. The varnishing is done in an ingenious manner, which our readers will do well to note. Our host makes use of a little "cheerful stove."

M. Lafosse's retouching room is also worth making a note of. The light enters from a wide window in front, but a curtain depending from the ceiling shuts out direct illumination, except where the row of retouching frames are placed. The ceiling and wall behind are painted a dark neutral tint to absorb the light and not to reflect it, so that while the apartment is softly illuminated, the light behind the negatives is still exceedingly vivid. Altogether this retouching room is a model.

M. Lafosse is of opinion that something novel is necessary to give healthy impetus to photographic work, and he has not much faith in the promenade or any other style of portrait effecting such beneficial change. "We do not want merely a variation in the cutting or mounting of photographs, but some modification of the photograph itself. A real cameo, or bas-relief portrait, in which the face stands out from a dark background, would make an attractive picture, for example, if we could only produce such things." Possibly, now the Woodbury patent has lapsed, we shall have some attention given to the production of photographic portraits in relief; at any rate, M. Lafosse's idea is well worthy of record here.

MR. J. W. SWAN AT NEWCASTLE-UPON-TYNE.

MANY of our readers will envy us an afternoon spent in Mr. Swan's laboratory, but we will do our best to share the benefit of it with them. Mr. Swan has always been a pioneer in photography, and where he does not originate, he makes such sound improvements, that he never fails to leave his mark upon any branch he has to do with; and there are few branches to which he has not given attention. The names of carbon printing and Swan are synonymous; and if the photo-relief process had not been so timely secured to himself by Mr. Woodbury, the eminent Newcastle chemist would have made it his own. Mr. Swan preceded Baron Von Lenk by some years in the manufacture of guncotton from "slobbings and rovings" instead of from cotton wool, for soon after the exhibition of 1851 Mr. Swan commenced to prepare pyroxylin from this description of cotton, and has continued to do so for collodion making ever since. When the news was flashed from America that Mr. Edison had at last found out the way of lighting up our dining rooms and libraries with electricity, by the simple expedient of rendering incandescent a tiny horse-shoe of carbonised paper, it was found that Mr. Swan, quietly working in his laboratory at Newcastle, had made the discovery some time before, and, moreover, had taken the precaution to patent it. The Swan lamp was in the market six months before the Edison lamp could be purchased.

As Mr. Swan has of late occupied himself with the preparation of gelatino-bromide, it goes without saying that he has made himself master of this new and delicate branch of photography. At the same time Mr. Swan is no enthusiast; on the contrary, he is somewhat sceptical upon the matter of new phenomena, and is more likely to disbelieve than to adopt a novel dictum. If you propound a theory in development, or express a belief in the special treatment of a film, he puts his hands behind him, and permits you the privilege of demonstrating the fact yourself, placing apparatus and chemicals at your disposal for the purpose. If you succeed, well and good; if you fail, he does not congratulate himself upon his foresight, but, like a generous foe, straightway proceeds to help you, repeating the experiment himself, to be quite sure that nothing has gone wrong, and that the theory expressed shall, at any rate, have every chance. The matter of development in the light, or rather commencing the development

of a gelatine film in the dark, and continuing the operation in subdued light, did not answer in Mr. Swan's hands, for half of the plate which had been treated entirely in the dark proved, on careful comparison, the better and brighter. At the same time, he was ready to admit that in the case of a comparatively slow plate, and under the action of very subdued light, a gelatine film, especially in the non-actinic oxalate developer, would not be likely to suffer to an appreciable degree.

Mr. Swan, in the manufacture of his plates, fully believes in the addition of a small proportion of iodide. We mentioned the opinion of several photographers who were unable to detect any difference between a film prepared wholly with bromide and one containing a proportion of iodide. Said Mr. Swan, you must be quite sure that there is iodide of silver in your plates before you make comparison; it is possible to employ an iodine salt when making your emulsion, and yet not form any iodide of silver, or, at any rate, get any of it in the finished product. But whether there is iodide present or no, is soon apparent on taking the films into daylight. "In this case you have only bromide of silver present," said Mr. Swan, showing us a series of plates of a pale primrose colour, which, when held up against the light, could scarcely be called opaque; "while here, again, this brimstone colour proclaims the presence of iodide of silver." These latter films were quite opaque, and this test, therefore, we commend to our readers as one that is likely to stand them in good stead. The plates must be examined as soon as they are brought into the light, as their tint changes after exposure for a minute or two; and in judging their colour, look at, and not through, the films.

The presence of iodide, therefore, from the fact that it gives a more opaque film, and thus prevents blurring, is an undoubted advantage, while for the same reason it adds vigour to the image. Mr. Swan also believes that the addition of iodide is of value in contributing towards clear shadows and vigorous high lights.

As to the quality of the bromide formed, and the nature of its particles, whether coarse or fine, of which we have heard a good deal of late, Mr. Swan has no hesitation in saying that the coarser the particles, the more sensitive is the bromide. Moreover, he believes that the colour seen, when viewing a glass plate coated with emulsion, as a transparency, is not due to the

emulsion itself, but simply to the passage of light between the particles; that is to say, when the particles are fine, the light transmitted appears to be orange or red; while if the bromide particles are of a coarse nature, the light transmitted is grey or blue.

Notwithstanding the greatest care in emulsifying and preparing the plates, Mr. Swan finds it impossible to control the sensitiveness within certain limits, and for this reason he adopts the common-sense plan of carefully testing the plates by a standard after the emulsion is made, and recording this sensitiveness. In this way he knows what he has made, if he does not know how he has made it. Every batch of plates is tested for density, sensitiveness, frilling, and spotting. The plates after coating are permitted to set—under an hour is the time necessary—and then dried in an atmosphere very slightly raised (between 70° and 80° Fah.) for a period of twenty-four hours. They are then packed, not only with a view to shelter them from light, but also from that arch-enemy to gelatine, damp (the packing we need not describe, as any purchaser of the plates can examine it for himself), and they then come before the inspector. One assistant is engaged on no other work but that of inspection, and it is his duty to take haphazard a per centage from every batch for trial. The plate is put into a printing frame under a standard negative of known intensity, at a distance precisely of ten feet from an ordinary fish-tail gas-burner. A standard developer is employed, and a sand glass that runs exactly three minutes and a half serves to fix the time for the plate to remain in the developer. With these fixed conditions, the sensitiveness of a batch of plates is soon determined approximately by an experienced assistant, and he then decides whether the plates are 5, 10, 15, 20, or 25 times quicker than wet collodion, information that is at once marked outside every packet of the batch.

Mr. Swan showed us an interesting series of negatives illustrating the effect of strong and weak developers, and the influence of varied intervals of development, in order to prove the control that may be exercised in coping with under- and over-exposed films. His normal developer in this case was six grains of ammonia and six grains of bromide dissolved in one ounce of water on the one hand, and on the other, pyrogallie acid dissolved in one ounce of water in various quantities. Thus we

saw plates (all with the same exposure) developed with half a grain, a grain, and two grains of pyrogallic acid, and further examples showing the effect of these developers after an interval of two minutes, three minutes, and six minutes. Mr. Swan believes that many failures in development are due to employing ammonia of not sufficient strength, and pyrogallic acid not freshly prepared. The whole formula obviously is deranged if attention is not paid to these details.

In removing the film from a gelatine plate, when such a thing is desired, Mr. Swan has recourse to the employment of methylated spirit for hardening; that is to say, when the film has been alumed and floated off by the application of a little very dilute hydrochloric acid, he toughens and contracts it again by immersion in spirit, when the film may be handled without much fear of the consequences. Whether the operation can be done in the case of paper remains to be seen.

Mr. Swan's laboratory is an *affaire de luxe*; it opens into a glass corridor, at the one end of which is a dark closet, and at the other a fine glazed studio. The laboratory is a most agreeable apartment, being, in fact, Mr. Swan's library, which is converted, by very simple means, into a dark-room. The two doors are provided with strips of list, and with mats fitting into the threshold, so that no light passes them. The large window is covered with a four-fold thickness of orange paper, and the lights of the gaselier—with the exception of one jet that is turned up now and then for testing—are provided with ruby chimneys. The orange paper, by the way, is of Mr Swan's own preparation, and has been made especially for his plates.

There is a tap and sink in one of the cupboards, and some big porcelain trays with hyposulphite and alum conveniently at hand. You have simply to turn the keys of the two doors and lower the gas, and you are in a dark-room that is by no means dark. But, with his very sensitive plates, Mr. Swan has to take care, and, therefore, he has his developing-dishes provided with covers, which are employed as frequently as possible.

In respect to the gelatine which is most suitable to the preparation of plates, Mr. Swan does not mind that which is a bit turbid; in fact, he does not lay much stress at all upon this quality, so long as the material is otherwise sound. But he will have nothing to do with gelatine that contains traces of acid, no matter how transparent it may be. Mecha-

nical tests, or its capacity for absorbing water, are not gone into; but, on the other hand, no sample is approved until it has been actually tried for emulsion making.

Speaking of a suitable electric light for the studio, which would be required for a brief period at intervals, Mr. Swan says the lamp may be of the simplest description. Two sockets to hold the two carbons, one fixed, and the other to slide or screw in a tube, so that by hand the two carbons may be brought together or separate, is all that is absolutely necessary for photographic work.

For portraiture, where everything ought to go as quickly and smoothly as possible, it is an advantage to have a lamp with a simple automatic action for instantly distancing the carbons when the current is turned on by the switch.

The upper carbon should be large, and the lower one smaller and pointed. The two should not be in the same axial line; the point of the lower carbon should abut against the front edge of the upper carbon, so as to produce the excavation on its point edge indicated in the sketch. The object of this arrangement is to have the whole light of the incandescent crater which forms in the positive carbon, and which is the chief source of the light, thrown forward. The upper carbon is, of course, supposed to be the positive carbon.

With a lamp of this kind, the light need not be turned on until it is wanted. The turning on of the light should be effected by a strong and massive switch. In the distancing mechanism the click action of the Brush lamp has been adopted.

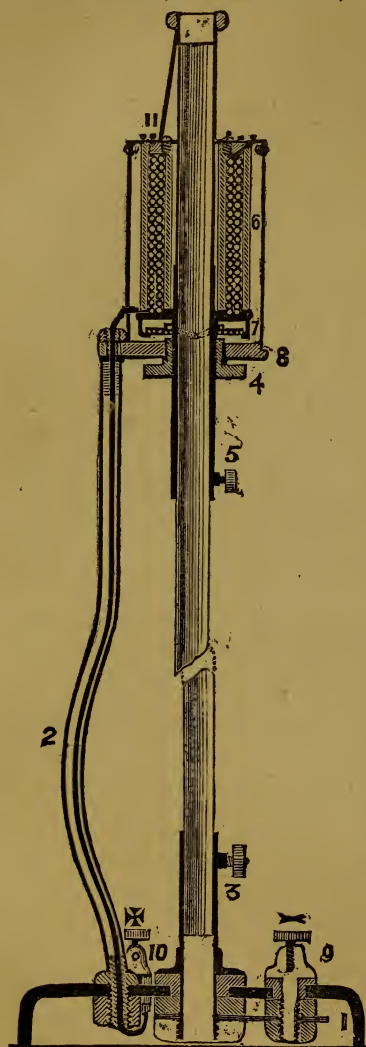
A description of the lamp is given on next page. Its action is as follows:—

The current, passing up the column and through the electro-magnet to carbon holders, at once causes the electro-magnet to attract the keeper, which in its turn lifts the clutch at each side, and causes it to raise the carbon holder and carbon, the arc is established, and the current passes through the lower carbon holder to the negative binding screw and through the battery.

The moment the arc becomes too long the electro-magnet is weakened, and the keeper, clutch, and carbon drop, to be at once snatched up again by the re-invigorated magnet, and the arc is again formed.

When the current ceases, the keeper, clutch, and carbon

1. Cast-iron stand. 2. Pillar supporting upper carbon mechanism, made of brass tube bent, as shown, to avoid heat of arc; the lower end is secured on to the base by means



of brass bolt, screwed inside tube, and nut on the other side of base. The upper end holds the platform 4, and is fastened to it in the same manner as the base connection. A hole, large enough to admit the insulated wire, passes through the bolts at top and bottom of standard. 3. Lower carbon holder, made of brass tube, the exact size of carbon, with screw to secure it. A brass angle piece is soldered on to the lower part of holder, and insulating material—ebonite, vulcanite, or asbestos card of the shape shown—is introduced between holder and stand. The two binding screws, 9 and 10, are also insulated from the base in like manner, and connection is made between 9 and 3 by a copper plate screwed under both. 4. Brass platform, supporting electro-magnet and upper carbon holder. The brass case, covering electro-magnet, is soldered on to the platform on all sides, except where pillar is fastened. The lid of case is fastened to case with three screws, and the electro-magnet is screwed on to the lid. 5. The upper carbon holder, with set screw and ebonite top, slides freely through the regulating screw and the top of case, and is guided thereby. 6. The electro-magnet, of the type known as a cylinder magnet. The outer pole is screwed on to the inner one at the top, and two layers of insulated copper wire are wound inside. 7. The magnet keeper is a washer of soft iron, guided by a tube soldered to it, and working upon the carbon holder. There are two brass fingers screwed on to the keeper opposite to each other, a layer of paper separating magnet and keeper. 8. Clutch is a washer with raised edge inside, split through the centre and hinged on each side of carbon holder; it is just large enough to allow the carbon holder to slide easily through it when the halves are in one plane, but the moment it is raised by the fingers on each side it grips the carbon holder. The regulating screw alters the lift given to the upper carbon; it forms a table for the clutch to rest on. 9. Binding screw, insulated from the stand, and connected with lower carbon holder by copper strap underneath stand. 10. Binding screw, insulated from stand, and connected with upper carbon holder by copper wire, with one end screwed underneath nut of binding screw; the other end of wire passing up the column to electro-magnet. 11. The flexible cord. The top end of the electro-magnet is pierced to allow of the insulated wire passing through, and one end of a piece of flexible cord, composed of a

great number of small copper wires, is soldered to the wire from the electro-magnet which projects above the cover; the other end of the flexible cord is soldered to the top of the carbon holder.

drop; the keeper rests on the small shelf which is highest on the clutch, the clutch rests on the regulating screw, and the upper carbon on the lower one. It will be noticed that the lower carbon is slightly in advance of the upper one, in order that the glowing crater formed by the arc may be in front.

Both carbon holders are open at top and bottom, to allow of any length of carbon being used. The lamp is strong, and, having little mechanism, is not liable to get out of order, and it can be easily taken to pieces.

The binding screws are shown in the engraving, for the sake of clearness in explanation, out of their proper places; they should be opposite one another at right-angles to a line drawn between the column and lower carbon holder.

There is no regular feed in this lamp, as the regulations of the arc will be few, and it is not likely that one would occur during the time the lamp was used for the photograph, and even if a regulation did occur, it would be so quick as to be almost inappreciable.

MR. W. HARVEY BARTON AT LLAN HOUSE, BRISTOL.

“A Bristol Mansion in the Olden Time.” The picture is so familiar, we need scarcely describe it. A lofty, narrow building with peaked roof, storey above storey projecting; queer bay windows of mullioned glass, panels and quaint wood-work everywhere, and a prevailing air of antiquity that calls vividly to mind times and events we read of in history. Here is something more than a dusty page to remind us of days long ago. With the picture before us, we can people the old house again: the grand dame with her hooped skirt and peaked bodice, her high-heeled shoes and flaxen curls; the sedan that will presently arrive to bear her ladyship to rout or card-party; the yellow waxlights in heavy candelabra soon to illumine the windows. By-and-bye, ancient Dogberry and the watch will come their rounds, and call the hours of the night. There is no vulgar lamp-post, or figure in modern attire, to mar the delightful picture.

It is such a scene as Charles Dickens would have loved—one of those forgotten nooks and corners the great novelist always

delighted to paint. Indeed, if we were asked to compare photographers with writers, we should at once pronounce Mr. Harvey Barton the Charles Dickens among photographers, and for this reason: not only does the Bristol photographer display a reverence and loving fondness in choosing his subjects, but he treats those subjects as though he loved them. He is but their slave, and he works earnestly, conscientiously, indefatigably, and with his whole strength and will to do the best he can. Mr. Barton, in his true, straightforward manner, sacrificing all to the attainment of an artistic result, reminds us more of Rejlander than any living artist.

We have purposely dwelt upon Mr. Barton's rare treatment of architectural subjects, rather than on his excellence as a landscape photographer (and only those who know his sweet summer pictures are aware how high is his reputation in this branch of the art), because it is in architectural photography that we possess few, very few masters. The difficult technicalities Mr. Barton has not only overcome, but, by his choice and treatment, he manages to inspire the pictures of brick and stone with sentiment and nobleness. Look at the lofty tower of St. Stephen's; it is delicately and harmoniously limned from base to spire; there are no inky shadows below, no eating in of the lights on high, and, above all, the grace and elegance of its proportions are fully displayed.

We cannot tell our readers how Mr. Barton manages to breathe this spirit of poetry into his pictures, but we can do this: we can place before them the subject of an hour's chat with a modest, kindly gentleman, who expressed himself over and over again not only willing, but anxious, to place at the disposal of his brethren any experiences he might possess. Our first question was naturally touching the fine architectural views he had produced, and we are sure Mr. Barton's frank statements on this subject will be duly appreciated by our readers.

"I am afraid I hardly work in accordance with acknowledged rules," said our friend. "Many, about to take an architectural subject, begin by tilting the camera; this I always leave to the last. I first choose the highest station I can find (that tower of St. Stephen's was taken from a window thirty feet from the ground), and then choose the longest focus lens I can use. The third thing is to raise or lower the lens out of the centre of the camera; I do not know whether there exists in this country

another apparatus besides my own that permits of lowering the lens below the centre; but it is, nevertheless, frequently a matter of necessity. Having done this, I finally tilt my camera, and adjust the swing-back."

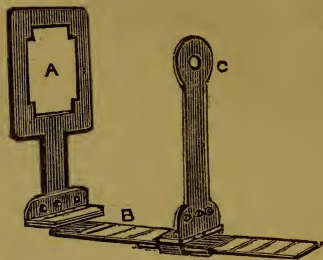
Mr. Barton then proceeded to detail other important points. Forty-five degrees is a convenient angle for the light to shine upon your object; a small stop must be used, and full exposure given, the usual stop employed with a 26-inch focus lens being from $\frac{1}{2}$ to $\frac{3}{8}$ inch. One of Mr. Barton's lenses, by the way, has forty inches focus. More importance still is attached to the character of the collodion, developer, and bath employed. Mr. Barton employs collodion of standard makers, sometimes alone, sometimes mixed; but he invariably employs this, as also his iron developer, in an unusually ripe condition. To the collodion he always adds from half to one grain of bromide of cadmium per ounce. "The faults of architectural pictures, the inky shadows, &c., which you were mentioning just now," said Mr. Barton, "are always exaggerated if attention is not paid to this subject." The collodion must be yellow, and the developer yellow; but the bath must be as fresh as may be. Mr. Barton employs a shallow horizontal bath (made simply of pinewood, varnished, with its crevices filled with marine glue), and, in busy times, *he makes up a fresh bath every day.*

"I always think doctoring baths waste of time," is Mr. Barton's opinion. However, he does two things invariably to ensure a good bath: he fuses his silver crystals himself, and only employs water of his own distillation, sometimes adding permanganate to the water before it is distilled. The bath is fully saturated with iodide before beginning to work, and the first plate immersed should be a success. A new bath is a condition to the production of brilliant and harmonious negatives.

Here is Mr. Barton's battery of lenses, and here is his range-finder, or, rather, lens-finder. The lenses are contained in a compact box; here is the single landscape, here the rapid rectilinear, the symmetrical, the wide-angle, &c., each to be used upon occasion. As we have said, Mr. Barton employs a long-focus lens when he can; but, like all of us, he has to bend to circumstances. He has taken up his station, fixed his camera, and has now to choose his lens. There is no hesitation, for his lens-finder tells him at once. Here is a description of it.

There is a brass frame-work (A); this embraces the picture

you are to take, and, as you hold it up before you, you make it frame the view you want. On the rod (B) slides to and fro a sort of back sight (C) which has a small opening for the eye.



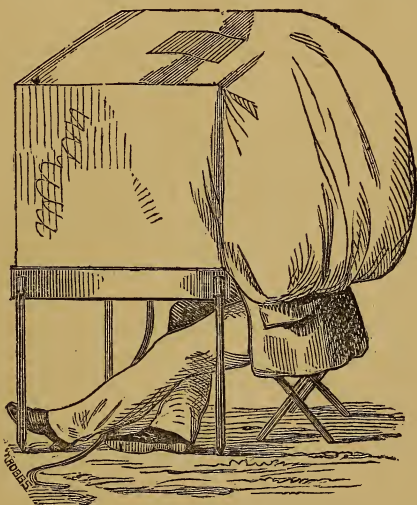
You look through this back sight at the frame (A), sliding the back sight (C) nearer to or farther from A, until you see the whole of the view you want. This done, you look at the scale upon the rod, and according where the back sight rests, so you choose the lens indicated on the scale. The instrument is a very simple one, and any photographer can make one for himself in the same way as Mr. Barton did, viz., by practically trying every lens with the instrument, and noting the result on the rod on which the back sight slides.

Mr. Barton has a simple and ingenious way of getting rid of vibration from a drop-shutter; it is to provide the latter with an extra leg for itself, which thus renders it practically independent of the camera. This spare wooden leg is, indeed, a valuable bit of apparatus, for it serves, too, to give steadiness to a large camera when this is pulled out to its full extent, and requires extraordinary support behind.

We have no time to tell of Mr. Barton's big apparatus, his tall solid stands (that for cathedral work is some fourteen feet in height), for there are the printing, mounting, washing, and emulsion rooms to be visited. In the last, Mr. Barton reverses the order of things, having a light cupboard in a dark-room, whither he can retire at will. The mounting is done in a somewhat original manner; it is the reverse of dry mounting. The prints, still wet, are brought into the mounting-room, and laid, face downwards, on linen shelves, placed in tiers under the mounting counters. Here they dry flat. The large mounts of soft card are moistened over their entire surface; a girl dips a

brush into hot glue (pale Russian glue is employed), and applies the liquid lavishly to the mount, without confining herself to the space shortly to be occupied by the print. The latter is similarly steeped in the transparent liquid, placed upon the cardboard, and then pressed down, and the superfluous glue removed with a squeegee.

We should like to have described Mr. Barton's low, sturdy



tent (Mr. Barton follows Mr. Francis Bedford's capital plan of sitting down at work), his printing arrangements, his travelling apparatus, &c., but our space forbids. We show, however, a sketch of the tent, which will at once demonstrate its stable and convenient character.

MR. W. H. MIDWINTER AT PARK STREET, BRISTOL.

IN appointing their jurors to award the medals of the International Exhibition, the Bristol Photographic Association acted wisely in nominating, among others, a portraitist in the town of established reputation. Mr. Midwinter's portraits would, indeed, entitle him to take high rank in the metropolis ; but, perfect as

they are, both from an art and technical point of view, it is not on this account alone that we introduce Mr. Midwinter's studio to our readers. It is more because the little establishment of Midwinter's—for it is not a large one—is one of the most finished and perfect ateliers we have ever seen, and is, indeed, in many respects, a model studio.

If you want a thing well done, do it yourself, is the axiom adopted by Mr. Midwinter. The studio and dark rooms have but one ruler. "Before the advent of gelatine plates, I required the services of two assistants ; now I have only one. Nobody seems to have insisted upon the saving gelatine has worked in this direction," said our host ; "gelatine plates save me the salary of a junior assistant, and this is a matter of some consideration in a small establishment." Mr. Midwinter is so fervent a believer in gelatine, in fact, that he has not a silver bath in the house, and for the past eighteen months has employed none but the gelatino-bromide process.

But we must first say a word or two about Mr. Midwinter's portraits. Had we to describe their prevailing feature, we should say it was to be found in simplicity of pose. The backgrounds and accessories, when apparent, are the very reverse of elaborate, and the pose and attitudes chosen appear to be altogether unstudied and natural. We say, appear to be, because, as everybody knows, the less one sees of an artist's handiwork in his result, the more modest, unaffected, and pleasing is that result likely to be. How few photographers, for instance, could pose a model like this female figure on the easel ! She stands before you a supple form, full of grace, her arms in front of her, one hand simply laid upon the other. Or, turn to this group, and look at that little maiden laughing at you—a fresh, girlish laugh, like a burst of sunshine. There is nothing mechanical, tricky, or stagey about the picture ; it is nature itself.

Our readers will like to know what the Bristol public pay for good portraits. According to the card of terms, cartes-de-visite are charged from ten to twelve shilling a dozen, large heads being at the rate of fifteen shillings ; while cabinet portraits, if plain, are twenty shillings, and vignetted, thirty shillings a dozen. Underneath, we are glad to read the words : "The above terms are strictly for payment at the time of sitting." The reverse of the card of terms is an appointment form, in which the date and hour require to be filled in to complete it.

We pass into the studio. It is the lightest and brightest we have ever seen. The whole of one side, barring a three-foot skirting-board, is of glass, and the sloping roof is, to a great extent, glass also. The fact, too, that the ribs and frame-work of the structure are of iron, adds further to its light and airy nature. A pale blue paper covers the walls, and as there is nothing but a camera at one end of the studio, and two or three screens at the other, a sense of space and freedom prevails, rarely to be met with, even in very big studios. All is as clean and bright as a new pin, qualities that photographers might certainly study more than they do.

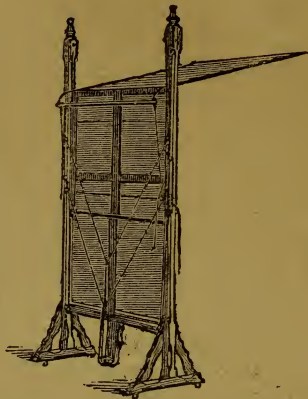
Our visit is on a dull December day, and at the moment Mr. Midwinter is availing himself of all the light he can—a lucky man, indeed, to have so much at his disposal.

But how does he manage to subdue the illumination in fine weather, it will be asked? In the first place, he acts after the manner of many Parisian photographers; he can stop out the top light by a system of blue blinds or white blinds, or even both together. Roller blinds are used that lap one over the other, the blinds at the top pulling down, and those below pulling up. The roof is neither clear nor ground, but frosted glass, and with very good effect. This frosting Mr. Midwinter brings about by the application of a mixture of driers and oak varnish, to which a little French blue is added to take away the yellowness. But the model is lighted—or, rather shadowed, if we may so term it—by local screens, rather than by the window blinds. On the light side of the sitter is a fine cambric screen similar to that employed by Mr. Slingsby, of Lincoln,* while on the shadow side is a screen of calico with a canopy at the top, bending over at right angles above the sitter, this canopy being heightened or lowered at will to suit the height of the sitter. The canopy is of a blue or slate colour, and so that our readers may more fully understand its nature, we give a sketch of the whole structure. By the aid of these screens the local lighting of the model is easily controlled.

Mr. Midwinter's experience of his studio and the light therein permits him to develop with singular constancy. His rule is to develop invariably for sixty seconds, and he holds a negative to be unduly exposed that does not give a good result with this

* See Mr. Slingsby at Lincoln.

constant treatment. He has learnt to know his developer so well that he prefers to take this as his starting point, and to make other conditions bend to it. He employs a pyrogallie



The structure consists of two side screens, one above the other, and an overhanging or head screen. Of the two side screens, the lower one remains stationary, but the other one, which overlaps, may be made to rise to its full extent; in our sketch it is half-way up. The structure may, in fact, be raised to 8 feet, or lowered to 4 feet. The head screen rises and falls with the side screen, and, provided with the lever arrangement shown in the sketch, may be made to assume any angle. The lower cord raises or lowers the side screen, and the upper cord regulates the angle of the head screen or canopy.

developer, but uses only half the quantity of pyrogallie set down by standard makers in their formulæ. When results are not as they should be, he does not vary his development, but prefers to alter the lighting or time of exposure. Mr. Midwinter lays great importance on the circumstance of having one condition in the preparation of a negative always constant.

The employment of gelatine plates is not the only economy Mr. Midwinter practises. He employs nothing but albumenized paper ready sensitized for printing, and avows that the tones and quality of his pictures are fully equal to paper sensitized at home; so that he neither requires a sensitizing bath for plates or paper. The printing rooms and washing rooms, all in apple-pie order, are distinguished for the same brightness and cleanliness we have before remarked upon—qualities, we believe, inseparably con-

nected in the minds of tidy housewives with the fact that you can—if you like—eat your dinner off the floor.

Mr. Midwinter shows us his washing trays and dishes. They are self-made; a frame-work of wood, with a sheet of plate glass let in, not at the bottom of the frame, but only half way down, so that each utensil is a double dish. You might employ one side for a hyposulphite solution, and having done with the liquid, and thrown it out, turn over the bath, and employ the other side for developing dry plates in pyrogallic solution. There is thus no fear of contamination. A glass plate bottom being perfectly flat permits of employing much less liquid than is necessary in the ordinary bath. A shellac varnish applied to the woodwork protects it from the action of any liquid with which it may come into contact.



MESSRS. RUSSELL & SONS AT WORTHING.

THE judges at the Pall Mall Road Exhibition recently awarded a medal to Messrs. Russell and Sons, of Worthing, the particular picture securing the honour being a group of three ladies posed with rare grace and skill. This, coupled with another excellent picture—that of a rough countryman laughing and showing every tooth in his head, a laugh so infectious that you could not pass the portrait without laughing too—showed what good work could be done in Messrs. Russell's studio, and we were very glad, therefore, when opportunity permitted us to pay it a visit. The two pictures we have alluded to were so excellent that the judges must have had some difficulty in selecting the one to which the green label "medal" should be attached; they chose, as we have said, the group. We should have chosen the other.

This countryman picture deserves just a word of comment. It was the work, we believe, of Mr. Fielder, the principal assistant of Messrs. Russell and Sons, and was forwarded to the Exhibition as a result which had received "not a touch on the negative, nor a touch upon the print." Now this is a very important point, but, unfortunately, the information was by some oversight omitted from the catalogue. Had the fact been duly chronicled,

not only the judges, but the visitors too, would have taken much more interest in the picture, for although no objection may be raised to moderate retouching, the absence of any working up—all things being equal—adds obviously to the value of a photograph. We mention this not for the purpose of questioning the judges' dictum, nor on behalf of Mr. Fielder—for to that gentleman was due the production of both studies—but simply to show the desirability for publishing the fact of a picture being untouched when this is really the case. Naturally, the artist prides himself a good deal upon this circumstance, and yet, despite its importance, it is ignored altogether. As to the jovial countryman himself, with his flowered waistcoat and unkempt hair, we may add something else, only our readers must take what we tell them in the strictest confidence. The countryman is an old hand at making people laugh, and that is why he succeeds so well in the picture; it is Mr. Harry Poulton, the comedian.

Messrs. Russell's studio is a spacious oblong apartment, measuring, perhaps, 30 feet by 16 feet. It has a northerly light, which is, however, only permitted to enter in moderation. There is a skirting-board four feet high, while practical blinds are capable of shutting out the side light. It is the top light that is most employed for illumination, but the glass here does not reach to the apex of the roof. Therefore the light above is not strong, since it comes, so to speak, from a window in the roof, and not through one whole half of the roof itself; moreover, the glass is rough and not clear. The curtains to admit the side light are adjusted when the model is seated; those nearest the sitter are light, and they get darker towards the camera end of the room. "Pronounced shadows and high lights should be in every picture," says Mr. Fielder; "but, of course, you want something besides black and white."

For taking any photograph above the size of a carte or cabinet, Dallmeyer's rapid rectilinear for 10 by 8 pictures is here used, an instrument which Mr. Dallmeyer himself, singularly enough, simply recommends "for general use out-of-doors." For the panel or promenade style, as we ourselves can testify, the lens is excellent, rendering drapery on the margin of the picture with marvellous Fritz Luckhardt-like detail. There is an ordinary chimney-piece and fender in the studio, and this is made to do duty with good effect, both in winter and summer; only, so it seemed to us, it was the lady who affected the mantelpiece and

mirror in the summer time, and the gentleman, with his foot on the fender, in winter.

Of backgrounds there were very few in the studio; but a snow landscape deserved attention. The trunk of a tree with matted snow on one side, as the result of a drifting storm, was a prominent feature, but the white landscape was not overdone; the flooring was of canvas, with a few roughly-marked foot-prints, and cotton-wool was employed to add to the effect. A grass ground was also very clever, made of green silk threads—one of Atkinson's, we were told—and with this some good recumbent models had been photographed: gentlemen lying at their ease on the sward, reading and smoking. "We have all sorts of possible and impossible accessories," said our host, "pointing to a large stock of furniture, "but we like to employ them as little as possible now-a-days."

The silver bath has been for some time past dispensed with at the Worthing studio, and only gelatine is employed; and this, strange to say, without any alteration to the dark room. This has an orange-stained window and two tammy curtains. But the relief in being able to do without collodion was beyond description. The dark room is on the roof, and therefore exposed to the action of the sun, the consequence being that in summer the ether and alcohol fumes were well-nigh insupportable. "Only those who work in a dark room like this," said our host, "can appreciate the value of gelatine plates. The health question alone would be enough to bring gelatine into favour."

Messrs. Russell and Sons print a proportion of their work in carbon by the so-called chromotype method, "but it requires a very good negative to stand it," we were assured. Beside the printing room is an open flat roof that serves as an out-door waiting room for visitors. We thought of M. Liébert's "terrasse d'agrément," where models in waiting smoke their cigarettes; if he could only secure a prospect like this, the bright expanse of sea, the green waves and white cliffs extending as far as Beechey Head, our Parisian confrère would be happy indeed.

Gelatine plates have given little difficulty in the experience of Messrs. Russell. Never to proceed with a batch if the first or second film turns out questionable, is the invariable rule followed, and in this way much trouble and worry are saved. Gelatine plates, when good, are simple and easy to work, and when they give trouble, the fault, nine times out of ten, lies in imperfect

preparation. Therefore, rather than lose precious time in attempting to secure an inferior result with a second-class plate, the questionable batch is put on one side and returned. When the developer is once fairly at work on the film, one or both of the tummy blinds are drawn up, and the manipulation proceeds behind a single thickness of orange glass. From this it will be seen that Messrs. Russell and Sons do not prepare their own plates. They give two reasons for this, and it must be admitted that they are good ones. In the first place, they are quite satisfied with the films that they purchase; and in the second place, the time of their establishment is already fully occupied in camera and printing work. So long as it is possible to obtain trustworthy films at a reasonable rate, say Messrs. Russell, we shall prefer to leave the difficult work of preparing gelatine emulsion to others. They are very proud of their mounting material at the Russell studio; as at many other establishments, the mounting of pictures caused a good deal of trouble and anxiety, but these have not been known since the employment of a material proposed in one of our YEAR-BOOKS. Since that time the Messrs. Russell have never employed any other material, and seeing it has given so much satisfaction, we take this opportunity of repeating its composition :—

Best Bermuda arrowroot	...	...	...	3½ ounces
Water	...	...	...	28 „
Sheet gelatine or glue	...	...	...	160 grains
Methylated spirit	...	...	...	2 ounces
Pure carbolic acid	...	...	...	12 drops

Mix the arrowroot with six ounces of water into a paste, then add 22 ounces of water and the gelatine. Boil and stir for three or four minutes, then let it partly cool. Finally, add carbolic acid and spirit; keep stirring till properly mixed.

STUDIOS IN SCOTLAND.

MR. JOHN FERGUS' STUDIO AT LARGS.

WHEN we first projected a visit to Scotland, with a view to seeing some of the principal studios north of the Tweed, we made inquiries not only in the photographic world, but also outside that circle, with the object of eliciting opinions as to the most profitable way of spending our time. Strange to say, a most singular unanimity prevailed. Professional and non-professional opinions all centred upon one name, and that was Mr. John Fergus, of Largs.

Where was Largs? A place called Lairg we knew, many miles north of Inverness, for we visited it two summers ago, walking thence on foot over the breezy moorland and purple heather, by heaven-blue lakes and silvery crags to the extreme north-west of Scotland—Cape Wrath—a promontory of red granite rising steeply out of the fretful waves. No, it was not so far north as that, we were told. You went to Glasgow, and afterwards by rail to Wemyss Bay; thence it was another seven miles to Largs, but there was no rail, and a carriage or boat became necessary. To put it roughly, it would cost a Londoner a journey of nearly a thousand miles, or, at any rate, nine hundred, to go to Largs and back.

But if the journey was sure to be a long one, it was equally certain that we must not attempt to sketch the studios of Scotland without including in the number Mr. Fergus' establishment. Nay, so highly esteemed is Mr. Fergus' name by one and all in North Britain, that it is but a matter of course that in attempting to describe Scotch studios, a sketch of his must of necessity come first.

We land from one of the Clyde steamers. Largs, apparently, is a fishing village, but is a modest little watering place as well, though scarcely so well-known as Rothsay, Millport, and Dunoon, hard by. It looks something like a Normandy port. There are a few shops on the quay, and a "Temperance Hotel" painted the colour of *café au lait*. We walk up the main street, consisting of half-a-dozen shops on either side, and thence proceed through the village of quaint one-storied dwellings. Not a

sign of a studio is there, so we pass on until we get into the open again. We cross a bridge, and come upon a country road, the houses getting few and far between. Indeed, we are growing despondent, when, at a turning to the right, affixed to a blank wall, we find a modest little direction—"To Mr. Fergus' Studio."

It is a house standing in its own grounds—so quiet and secluded, it might be a hermitage. But the spot is typical of its master. Mr. Fergus does not court publicity. He trusts to his work alone to bring him clients, and labours on quietly without occupying himself with aught else. He has no other studio than this at Largs, where he has been working conscientiously for twenty years past. Those who desire to be portrayed by Mr. Fergus must journey to Largs. To within the last year or so, Mr. Fergus has been his own chief operator, and it is only by reason of severe domestic affliction that we find him absent at this moment.

We enter the gallery. It is a fine lofty hall, with a Gothic roof, built of polished pine. The same wood is in the passages and corridors, and makes a handsome flooring. Everything is very neat, and exquisitely bright and clean. The hall and cool corridors are hung not only with photographs, but with many choice paintings; and at intervals are marble statuettes and fresh blossoms to add still further to the brightness and charm of the establishment. Our plan here (fig. 1.) is but a rough one, made

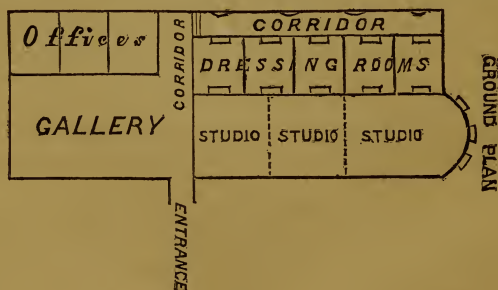


Fig. 1.

from memory, but it will convey some idea of the disposition of the establishment. From the gallery leads a corridor to a flight of steps, by which a longer and larger passage is reached. Con-

nected with this second corridor is a series of five dressing rooms, all elegantly appointed, the rooms leading by other doors to the studios, of which there are three.

Mr. Fergus' principal work is the cabinet portrait. An inspection of a series of these at once proclaims the master. The portraits are simple in pose—soft, and of exceeding brilliancy. Indeed, we have rarely seen such brilliant photographs. They are without glaze, but printed, evidently, on very thickly-albumenized paper, Mr. Fergus showing a predilection for a surface having a slightly roseate hue. Many of the portraits have plain backgrounds; none of them show elaborate accessories. Much taste is evident in the disposal of drapery, and the flowing robes of a model are marked with harmony and detail to the extreme margin of the picture. Yet it must not be thought that Mr. Fergus strives after effect by means of gorgeous raiment; the most charming study we saw was the simple portrait of a widow lady attired in weeds and crape-trimmed dress. The hair, streaked with silver, and the pale features, were limned with rare taste and delicacy, and in perfect harmony with the white cap and black dress; there was plenty of vigour, and yet no violent contrasts.

Mr. Fergus' charges for cabinet portraits are a guinea for the proof copy, and half a crown for every subsequent print. For cartes, a charge of eighteen shillings per dozen is made; and for the Imperial portrait, in size about twice as big as the cabinet, the proof copy is charged £3 3s., and every subsequent print five shillings.

We pass on to the studio, and, as we do so, cannot help admiring the perfect manner in which the establishment has been designed and fitted. A most complete system of electric bells finds place in the establishment, so that the chief has literally every employé under his thumb. The cool air comes through an open window at the end of the white corridor, and we can look out upon the sunny grounds, the red gravel walks, and dark shrubbery that surround the house. We know not whether the casual visitor is permitted access to Mr. Fergus' charming garden; but we doubt much if any other photographer in the world owns such a delightful residence. Through the dark foliage of fir and laurel are seen glimpses of the blue waters of the Firth of Clyde, while above rise the smooth green hills of Ayrshire—"Burns' ain countrie."

The studios are light and lofty. From our roughly-sketched section (fig. 2.) some idea may be gleaned of their character. On



Fig. 2.

The thick black lines represent opaque wall; the shaded lines dull glass; the open lines clear glass.

the light side there is dull glass rising to about twelve feet; above that, the glass is clear, while on the shadow side there is also some four feet of clear glass for top light. It goes without saying that the studio is not made use of (except, perhaps, in dull wintry weather) with all this light flooding into it, but that both curtains and screens—the latter especially—are made use of to modify and subdue the wealth of light at the photographer's disposal. Mr. Fergus takes few negatives bigger than cabinet size, and if larger portraits are necessary, these are made in the usual way, by enlarging and printing in pigments.

The wet process still lives at Largs, and seeing the beautiful results that have been secured by collodion, and the success which it has brought in its train, the silver bath is scarcely likely to be neglected for some time yet. Gelatine, however, has knocked at the door here, as at every studio throughout the country, and has received, if not a hearty welcome, at any rate respectful attention. But Mr. Fergus' work is carried on so quietly and methodically, that innovations have not the same influence at Largs as elsewhere.

One can scarcely leave Mr. Fergus' establishment without feeling pleasure in the fact that good reward has followed good work. Says Addison:—

“ 'Tis not in mortals to command success,
But we'll do more, Sempronius, we'll deserve it.”

Mr. Fergus certainly deserves the success he has gained, and we are happy, indeed, to find the reward has been so abundant. If we were now asked the question, "Where is Largs?" we should unhesitatingly reply, "Where Mr. Fergus' studio is."

MR. MARSHALL WANE IN EDINBURGH.

THE first in our series of Scotch studios—that of Mr. Fergus, at Largs—was selected by vote; this (the second) we chose ourselves. Nevertheless, we shall take little credit for our discrimination, for the name of Mr. Marshall Wane has been so long a household word in photographic circles, that to visit the city of Edinburgh without entering Mr. Wane's studio would have been foolish indeed. We do not know exactly how many medals Mr. Wane's magnificent pictures have brought him, but we counted at least five gold ones among the emblems of honour he has won; and those who are familiar with his work will not, we are quite sure, grudge him the possession of them.

Mr. Marshall Wane's studio in George Street ranks second to none in the kingdom. The handsome pair of rooms on the first floor, which contain examples of Mr. Wane's art, make a magnificent show, and especially for this reason: his portraits are not only executed with taste and artistic effect, but they are of grand proportions. What say our readers to studies taken direct from life measuring 24 by 20 inches, possessing all the vigour, brightness, and finish we are wont to see in first-class small work? Mr. Wane seems as used to plates of these Brobdignagian dimensions as if he had handled them all his life. There are a dozen examples of portraits in the gallery of these dimensions, and their breadth, atmosphere, and rich shadows are wonderful. Look at the brilliancy and purity of tone of this series of fancy-dress portraits, all taken direct on 24 by 20 plates. Here is a Madame Pompadour, the blue and pink satin represented by delicate grey and almost purple tones; and here a running footman of the olden time, with shining black hat and white gloves. They are but monotone prints, but the richness and harmony to tone seem to compensate for the absence of colour. A portrait of Miss Carlotta Leclercq, in a dress presumably of

damask satin, also deserves mention. The sheen of the satin is delightful; and the damask figures in robe, according as the light strikes them, and makes them appear sharp or hazy of outline, are particularly effective, leading one almost to suppose that a clever painter must have been at work on the drapery. Mr. Wane, of course, make use of gelatine in the production of these fine pictures, and it is certainly putting the "new power" to good purpose. During our visit one of these monster plates was exposed; a cabinet picture was first secured as a trial-plate—for it was a new batch of gelatine films—and then the bigger plate was put in the camera and exposed. Dallmeyer's 8 $\frac{1}{2}$, a lens of eight inches calibre, was used, with an exposure of fifteen seconds. We may mention, by the way, that Mr. Wane's studio experience of gelatine plates is, that they are practically from four to five times as rapid as wet collodion.

A forcible portrait of Sir H. Lock, the Governor of the Isle of Man, is a picture of which Mr. Wane may be justly proud, the modelling of the hands and vigorous rendering of the beard being masterly. "I think Mr. Wane's photographs wonderfully good," is a dictum bearing the signature "Louise Lorne;" and we make so bold as to echo Her Royal Highness's opinion; only, if we remain here in the gallery all day, we shall never get a peep behind the scenes.

There are two studios, and they are both of them very roomy. There is little furniture about, and all of it is real and substantial. In Edinburgh there is plenty of light, and consequently it may be screened off without compunction. Mr. Wane, on the

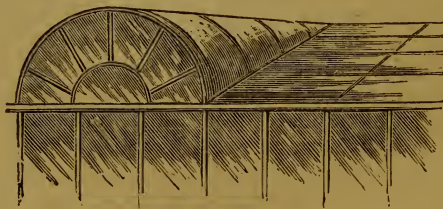


Fig. 1.

light side of his studio, uses a double tier of screens, one above the other, each screen measuring about four feet square; the screens fit into grooves against the glass, and so slide to and fro at will. The roof (see fig. 1) is raised in the centre, so as to give additional height, an arrangement, in Mr. Wane's opinion,

that permits of more effective lighting under certain circumstances. The dressing rooms are fitted with Japanese mirrors, viz., a mirror in front, with others on hinges at each side thereof, at right angles—certainly the most favourite form of looking-glass with ladies.

This is the finishing room. Mr. Wane uses fresh paste for mounting, and eschews black cards. As each picture of carte or cabinet size is finished, it is put into a large table drawer, of which there are several divided into small partitions or nests. The partitions have a little nitch cut into the side, so that the cards may easily be lifted out and counted at any moment. As soon as the number of cards is complete, and the order satisfied, they are taken out and sent off. By this table-drawer arrangement, the chief can always inspect the state of an order at any time, examine the work, and know how far it has progressed.

Upstairs are the enlarging, printing, and washing rooms. In Mr. Wane's establishment the scissors are used for trimming prints, the cuttings being collected every day and burnt, so as not to get trodden on and dirtied. In one of the rooms the fire-place has been removed, and, in lieu thereof, an iron box measuring about 24 by 18 inches, and some twenty inches deep, is located, into which the cuttings are put and ignited. This is not only a most tidy arrangement, but an economical one into the bargain.

Mr. Wane washes his prints in a revolving cylinder, with the nature of which some of our readers are familiar. After the pictures have been fixed, and rinsed in three or four changes of water, Mr. Wane professes to wash them in twenty minutes; and we are bound to say that some prints we took away with us, and examined for hyposulphite of soda by the well-known iodide of starch test, proved quite free from that compound. The washing apparatus consists of a drum-like cylinder, perhaps two feet in diameter and three feet long. It is placed in a horizontal position, as shown in our sketch (fig 2, page 190).

The outside cylinder, A, is simply a casing of tin to keep in the water; the inside cylinder, B, that revolves, is a few inches smaller than the exterior one, and it is simply a frame-work covered with a twine netting. If you look inside the apparatus when it is at work, you see this inside skeleton cylinder, B, revolving rapidly, upon the net-work being laid prints in the act of washing. These prints are washed in a two-fold manner. Water is squirted upon them in the form of little jets, and this

water is again thrown off by centrifugal force, as the skeleton drum bearing the prints rapidly revolves. In fact, the machine not only washes the prints, but, at the end of the operation, when the water is turned off, it goes a good way towards drying them,

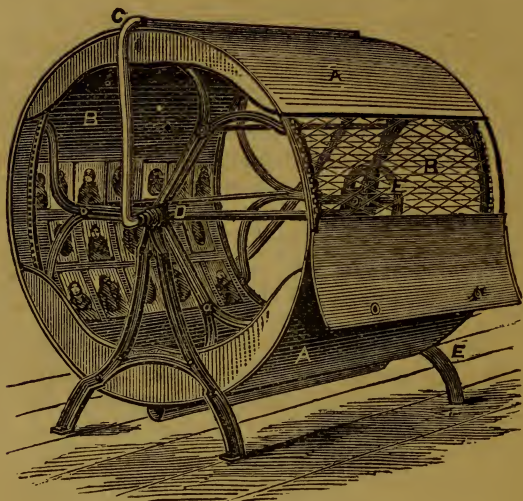


Fig. 2.

for as the drum continues to revolve, the water is thrown off the wet pictures. The outside cylinder, or jacket, as we have said, is simply for the purpose of preventing the water thrown off by centrifugal force being sent into every corner of the apartment.

The water is supplied by two iron tubes pierced with small holes, which tubes run lengthways through the drum—or, to speak more correctly, parallel with its axis. One tube, indeed, runs right through the middle of the drum, D, and the jets of water from it fall upon the faces of the prints as they come round in turn, lying inside the skeleton drum. The other tube, C, also pierced along its length with water holes, is at the top of the apparatus, between the outer cylinder and the revolving cylinder, so that the prints lying upon the network come round with their backs towards the falling water. Thus the prints, as they revolve, are first treated to a shower in front, and then at the back, and one can readily understand that pictures subjected to a con-

tinual spray, and, moreover, to centrifugal action, for twenty minutes, are likely to be as well freed from any hyposulphite they may contain, as immersion in running water for many hours.

The apparatus may be turned by hand, for it very light ; but Mr. Wane objects to this, for the reason that a stoppage at any time may bring about a fall of the prints, since these are kept in position around the inside of the cylinder by centrifugal force. On this account Mr. Wane has recourse to a water-motor, E, which is nothing more than a water-mill ; the water main supplied to his house in Edinboro' is quite potent enough to work the motor, which, we may mention, can be constructed by any water-engineer who knows his business. It may be mentioned that a washing drum working vertically does not seem to answer so well as the horizontal arrangement.

We have no time to speak of Mr. Wane's excellent printing arrangements (the printing is all done under ground glass, or under tissue paper), nor of his admirable way of storing negatives, each with its number plainly marked under the rack ; but from an elegant little card of terms, we quote the following to show that good prices are to be had in the Scotch capital for good work :—

Cartes, per dozen	...	from	£0	15	0	to	£1	1	0
Cabinets, per doz	...	from	1	5	0	to	2	2	0
10 by 8 in gold frame complete							...	2	10 0
12 by 10	...	...	...	...			...	3	10 0
15 by 12	...	...	...	...			...	5	5 0
20 by 16 (direct from life)	...	...	...	...			...	7	7 0
24 by 20 (do. do. )	...	...	...	...			...	8	8 0

MESSRS. JAMES VALENTINE & SONS AT DUNDEE.

THE largest photographic establishment in Scotland, and one of the largest in the world—that of Messrs. James Valentine and Sons—takes very high rank indeed. Mr. James Valentine himself died two years ago, just as he had completed the re-organization of the vast undertaking which bears his name ; but his sons (Mr. W. D. Valentine and Mr. George Valentine) have shown themselves in every way equal to the task of carrying out their father's designs. As many as forty employés are

to be found in the establishment of Messrs. Valentine, and it says something for their administrative ability that this number of hands is engaged all the year round. The work is so well regulated that, both summer and winter, there is plenty to do, in one department or the other.

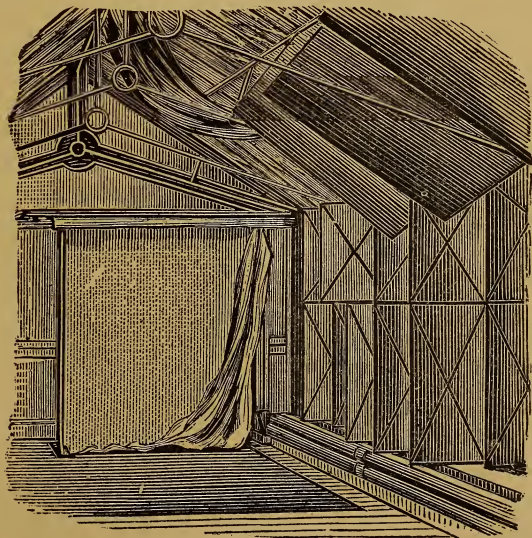
Perhaps the best idea of the extent of work done is to be gathered from the fact that 3,000 prints a day is not an unusual number to produce, while upon the printing-tables may be found, at any rate in dull weather, as many as 700 frames. The principal work is the production of views of Scotland, Mr. W. D. Valentine being responsible for the negatives, which, as our readers know, include the most delightful scenes that have ever been taken of that delightful country. Every phase of Scottish scenery is here. A cluster of dark granite boulders, strewn with brown seaweed, and beaten by angry waves, whose white foam is tritely characteristic of their spent wrath; a placid loch, with stately craft floating calmly on its surface; a solitary lighthouse of silver grey, rising from a clump of black rocks, and surrounded by turbulent waves flecked with white—a very painting; lichen-grown crags, sweet forest glades, delicate fern gardens, bowery foliage—in a word, nature in every shape and mood is here represented.

The Messrs. Valentine also enjoy high reputation as portraitists, and it is, indeed, into the portion of the establishment devoted to portraiture that we are first led. A hall tastefully furnished leads to the reception room, whence again a corridor takes us through the dressing-rooms to the studio. We may mention here that it is in the reception-room that the only open fire in the whole establishment is found, for, following the example of Mr. Marshall Wane, of Edinburgh, Messrs. Valentine employ hot-water piping throughout. They make use of Keath's boiler and coil, which is found to be exceedingly economical, for upwards of forty rooms are heated by its means, at an expenditure of between six and seven shillings a week. Gas cinders only are required for consumption, perhaps the most economical fuel one can use.

The studio itself, which is forty-six feet long, was most agreeably warmed (and this, too, albeit our visit was in February). Studios are apt to strike chilly in our experience, and if a sitter has to divest him or herself of any garments, a cold glass-room is not only unpleasant, but adds to the difficulties of

the photographer. In Dundee, no doubt, cold is a greater enemy than in most towns; but still, the example of Messrs. Valentine is one well worth following. Moreover, the system of heating obviates many winter difficulties. "The snow never lies on the roof here," says Mr. W. D. Valentine, "for there is always warmth sufficient to melt it as it falls."

Curtains are almost unknown in Messrs. Valentine's glass room. Side light, and light from the roof, is tempered by means of upright zinc shutters on hinges. The height of the lower range of shutters is 3 feet 6 inches, and of the upper one 2 feet 6 inches, their breadth being about 20 inches, the same as the sash. They are painted on the inside (that next the glass) of a pure white, and when opened more or less, reflect light upon the model at the end of the studio. Our sketch will give some idea of their construction.



Not only the end of the studio, but also the angle farthest from the glass, is fitted up as a background. The angle, indeed, forms a rustic arbour, tastefully arranged with fragments of cork bark, ivy, &c., so that with but little trouble it is constituted an apt and unconventional background for groups, &c.

A change from the ordinary flat background is at times very welcome, and by simply turning the camera this is here secured.

We pass through the retouching room, noting on our way two little points. The one is a plan of concentrating light upon negative or print; the ordinary plan, which has already been pointed out, is to have a spherical decanter of water near at hand, which condenses the light upon any spot upon which you desire to work; but Messrs. Valentine employ, instead of water, a weak solution of sulphate of copper, the greenish hue of the latter being less trying to the eyes. "It is what jewellers always use," explains Mr. Valentine. The other point is that of employing a developed gelatine plate instead of pure glass to support the negative during retouching; the brown tint of the former is also preferred, as being less injurious to the eyes.

There are no doors to the dark rooms. Mr. Valentine holds them to be not only unnecessary, but positively harmful. They give rise to dust, and they are always in the way. They are, too, easily done without. The passage leading to the dark rooms is only lighted from the top, the panes of the skylight being reddened. In these conditions of lighting from above, all that is necessary is to place inside the entrance of the dark room a broad barrier, or partition, round which you must walk to get into the room. In one of his dark rooms, by-the-way, Mr. Valentine showed us a huge pane of ruby glass, which, after but two years' exposure to light, had lost more than half its original colour. Photographers, therefore, will do well to look after their windows occasionally; fortunately, most of them begin by working in a light that is far more subdued than is actually necessary.

But we must pass on. We go downstairs to the printing department. This occupies the whole of the basement, the principal portion being a long room, in which there are no less than twelve tables ranged side by side, each measuring about 9 by 2 feet. It is the biggest printing room we have ever seen. At each of the tables stands a girl with printing frames, and her duty is simply to open each frame, withdraw the print, provide a fresh piece of paper, and then to push the frame through an open window to the printer. For, opposite each table, there is a window of this kind, opening directly into the yard, so that all the girl need do is to carry her freshly-filled frames to the side, and the printer, by putting his hands through, reaches them

without difficulty. In the same way, the frames are afterwards returned. In all photographic establishments, the difficulty is with new hands; but the Messrs. Valentine, by thus subdividing the work, get over it very well; that is to say, those inside the printing room need have very little experience compared with those occupied with the actual printing, who number among them the most skilled employés of the establishment.

The printing is done in the open air or under shaded glass, according to the season of the year. Many of the pictures require skies printing in, and this of course necessitates double work. Mr. W. D. Valentine arranges with the head printer what sky negative shall be employed for a particular picture, and then the printing frame containing this, instead of being returned to one of the ordinary changing tables, is taken to a separate department, where the sky negative is adjusted, and a suitable mask fitted.

The sensitizing of the paper takes place in a compartment at the end of the printing room. Three baths are employed, large enough to take a whole sheet, each bath provided at the end with a glass bar or rod, over which the sheet is dragged after being lifted from the liquid. There is no draining of the sheet; the glass rod has removed the spare liquid from the surface, and immediately afterwards the paper is pressed between blotting-paper. It is half dry by this time, and requires to be hung but a very short time to be completely desiccated. Nevertheless, Messrs. Valentine contemplate drying still more quickly by means of hot-water boxes, over which the paper will be stretched on net-work. The regulation time of floating the paper is two minutes; the strength of the baths, fifty-five grains of silver nitrate to one ounce of water.

It is one man's duty to fold the sheets of sensitized paper, and to cut them, a knife fixed hinge-wise to a board serving to do this very rapidly. "By this means, our prints have always clean-cut edges, a matter of much importance when it comes to toning and washing," says Mr. Valentine.

We have not time to speak of the negative rooms—all negatives in use being racked, while reserve and stock plates are packed in paper—but must pass on to the washing room. Here, raised in the centre of the long apartment, are a number of baths; there is, in fact, a double row of seven, so that two sets of assistants, facing each other, can work at the same time. The

prints are first put into No. 1 bath, rinsed, and then placed in No. 2, whence they are conveyed to No. 3, and so on till they get to No. 7. Above the baths are hanging india-rubber tubes, which supply both warm and cold water; and each bath is supplied with an outlet that empties it rapidly. The water from the first four baths runs off into a residue tank in the yard, but the other washings are thrown away. Each print is taken separately in hand, and handed from one assistant to another. After toning and fixing, a washing even more thorough ensues, for after rinsing all night in tanks, in which each print is nipped separately between laths to prevent conglomeration, the prints are put one by one on a glass plate, and subjected to the action of falling water, both warm and cold.

Messrs. Valentine have given the question of residues careful study. The tanks are placed in the open yard, in the full glare of daylight, for they find that the deposition of the chloride takes place much more rapidly out-of-doors, than in. In summer the deposition is very rapid, while in winter it is comparatively slow; but still there is no danger of losing suspended particles by drawing off liquid that has stood twenty-four hours in their tanks. Moreover, with the washing arrangement we have just described, the assistant cannot throw away valuable washings, but the liquids must of necessity run into the tanks. The bottom of these is wedge-shaped, so that when emptied of liquid the residue cannot be carried off.



Section of Residue Tank.

The old hyposulphite baths used for fixing prints are collected in a separate tank. The most economical plan is to treat them with so-called liver of sulphur, and thus extract the precious

metal in the form of sulphide. But, practically, Messrs. Valentine find it best to throw down the silver in the metallic form by means of zinc. Fragments of old zinc will do—sheeting, water-spouts, &c.—and from these the black deposit is brushed from time to time, and collected. “The silver collected from our hyposulphite washings fetched thirty pounds last year,” said Mr. Valentine, in reply to our question as to whether it paid.

We are next led into the mounting room. The mountant employed is gelatine soaked in water, and then dissolved in hot spirit. But they are very particular about the brushes employed, since most of these leave “brush-markings.” A brush two inches broad, of red sable, is the only instrument permitted in the establishment, and the price of these, we were told, was no less than fourteen shillings. The tables here are all covered with linoleum, not only to protect them from wet, but also because the soft character of this material is not likely to injure any albums or finely-bound books that come into the place.

Mr. W. D. Valentine has devised a very simple and effective shutter constructed of thin sheet metal. The actual drop piece is represented by figure 1; and by making the opening A of the shape indicated by the drawing, somewhat less exposure is given to the central portion of the plate than would be the case if a plain rectangular opening were adopted. This drop piece slides in a flat tube built up out of similar sheet metal, a pair of circular holes corresponding to the maximum working aperture of the lens being cut in this flat tube, and the whole arrangement fits into a slot which must be cut through the lens tube just in front of the diaphragm guide; a pair of arc-like pieces of brass, which are soldered on to the apparatus, serving the double purpose of keeping out light, and of ensuring that the apparatus shall always be so placed that the circular apertures correspond with the central portions of the lens mount.

The arrangement for releasing the drop is neat, and well worthy of note. Figure 2 represents it in section. The three interior lines represent a sectional view of the flat tube and the drop, while the outer shaded portion stands for a light metal frame



Fig. 1.

which can slide across the apparatus, but which is held towards the side A by the spiral spring. Under these circumstances the internal stud shown near B presses on the drop, and may support it either at the point C, figure 1 (half-cock), or at D, figure 1 (full-cock). Pressure on the end A of the sliding framework serves to release the drop.



Fig. 2.

To use the shutter, a slot has to be cut through the tube of the lens close to the diaphragm; then the shutter is inserted in the opening, the small flange keeping it in place, and preventing light getting in. To focus, press the spring slightly, at same time drawing up the drop till it catches and leaves shutter open. To expose, draw up the drop to its last catch. A very slight pressure on spring A releases shutter, which falls and shuts itself; a small piece of lead on B prevents any jar when the drop falls. It is well to carry several drops with different sizes of openings, using them according to light, subject, &c.

It will be well for our readers to bear in mind that it is generally undesirable to cut the lens tube for such a shutter as that of Mr. Valentine, it being a much preferable course to send the lens to the maker and get him to make a special tube with the required slot in it. On one occasion we required such an extra tube for a lens by one of the leading opticians, and the extra tube was in our hands four hours after we had taken the lens back to the maker.

MESSRS. T. & R. ANNAN AT GLASGOW.

MESSRS. ANNAN, of Sauchiehall Street, Glasgow, deserve honourable mention, if only for this: they are the one firm of photographers north of the Tweed which manufactures and uses its own carbon tissue. Many of us know the difficulties and vexations of carbon printing; but few have had the courage to make tissue for themselves, and fewer still continue to do so in spite of heart-

breaking failure and systematic discouragement. Messrs. Annan Brothers have for years steadily clung to the production of carbon tissue, and, at their works at Lenzie, near Glasgow, have succeeded in producing a material of excellent quality, as abundantly proved by the transparencies and enlargements which issue from the firm.

At Lenzie, too, Messrs. Annan have a manufactory of gelatine plates; but, in the present paper, we shall confine ourselves simply to a description of the Glasgow establishment, which furnishes us with matter quite sufficient for our purpose. Here, in the Gallery at Sauchiehall Street, we perceive at once one very important fact, namely, that permanence in photographic prints is one of the principal aims of Messrs. Annan. Look at this carbon print upon opal, representing Sir Noel Paton's "Fairy Raid." It is a photograph finished in black and white, we are glad to hear, by the artist himself, a circumstance alone that deserves record, since it shows that photography is no longer looked upon with such jealous eyes by painters. This carbon print upon opal measures no less than four feet, certainly the largest and finest we have seen of the kind, while we need scarcely speak of its excellence and beauty, since it has been so highly appreciated by Sir Noel Paton. Messrs. Annan have published many works of art of this kind, and, as photographic publishers, indeed, they take very high rank. Here is a series of portraits of the professors of Glasgow University, both taken and printed in carbon by Messrs. Annan, than which no finer collection of its kind has appeared. The portrait of Sir William Thompson, the electrician, is one of the best of them (they are taken $8\frac{1}{2}$ by $6\frac{1}{2}$ inches), and it is something to reflect that such good portraits are printed in permanent pigments. Here is a volume containing the divinity professors, and yet another filled with those of the medical staff, all of them names famous in the University world. In fact, Messrs. Annan might well be termed photographic publishers to the University, for we find still another volume filled with views of the Old College, which dates back to 1450—photographs that must be dear to all those inhabiting the second city of the empire, as we believe Glasgow is now entitled to rank.

Another excellent series of pictures we must allude to before we pass from this subject. They depict the whole of the painted windows in Glasgow Cathedral, and form a valuable record of

this branch of the art. There is almost colour in some of these casements, so delicate are the half-tones ; while the "staining" effect upon the glass could scarcely be better in the original windows. There is not, strange to say, a single instance of halation or blurring in these window pictures, which represent masterpieces of the modern German school. They are the work of Hess, Schrandolph, and Moritz von Schwind, the last-named artist distinguished more especially by his being chosen to renovate the Castle of the Wartburg in Germany, revered by the whole Lutheran Church on account of Luther having translated a large portion of the Bible within the venerable pile. The art of modern window painting—so far, at any rate, as designs go—may well be studied from this fine series of photographs, which puts vividly before the student, sitting at home at ease, transcripts of the master's work. Indeed, in glancing over these valuable publications of Messrs. Annan, the idea comes over us now and again, whether such work is sufficiently recognized. At Messrs. Braun's establishment in Dornach, which we visited a dozen years ago, a great deal of work of a similarly classic character is also prepared, and we could not help calling to mind the Alsace studio as we examined Messrs Annan's photographs. Fortunately, as in the Dornach establishment, these reproductions are all in carbon, and hence we may trust that the work undertaken at such great expense may, by reason both of its intrinsic value and permanence, be ultimately a source of profit to its progenitors.

As landscape photographers Messrs. Annan enjoy an enviable reputation. In London, we have repeatedly been made familiar with good work from the Glasgow studio ; but, to thoroughly appreciate its skill and taste, it is necessary to examine the beautiful pictures of exteriors and interiors of Scotch strongholds which here adorn the walls. Here is princely Glamis Castle, with its rounded turrets and spires, its grey walls, its weather-beaten casements, and handsomely wrought stone work. Here is Alnwick Castle, its fine lines sharp and clear in the leafy landscape ; here Dumbarton Castle on the Clyde, and here again Hamilton Palace. But better than all are these interiors taken on 16 by 13 plates, some by a Dallmeyer 12 by 10 rectilinear, and others by a Ross wide-angle lens. The "Duchess' Bedroom," for example, is perfect ; the satin bed furniture, the quilted coverlid, the folds in the rich drapery, are

rendered as softly as by the painter's art, while yet they possess all the detail and clearness of photography. "The Library," Hamilton Palace, is not less successful; the furniture, the book cases, the table-cloth—all are rendered with surpassing harmony and clearness, as if, forsooth, the photographer had chosen accessories of his own shade and hue, in order to secure the highest effect. There is no blurring, no halation, no solarization; the light is diffused as evenly and effectively as in a well-lit studio. All these interiors were taken with wet collodion, some of them with nearly an hour's exposure. Says Mr. Thomas Annan: "I use gelatine plates of our own making for interiors now, but we have not given up the use of collodion for outside work."

We go upstairs. Here are carbon prints and carbon transparencies in various stages. Impressions measuring 24 by 18 inches are considered but ordinary work, and three-foot pictures are not made much fuss about. The enlarging is done in the usual way from a carbon transparency, produced by printing upon tissue under the original negative, and in this way securing a vigorous, transparent positive. Some of the red-tissue prints of Messrs. Annan are very successful. A huntsman surrounded by his pack on the steps of a hunting-box looks like an old engraving by Hogarth, and so anti-photographic is it in appearance, that one wants the assurance of the printer almost to believe it.

The studio is spacious and roomy. It is lighted from the north; but the sun itself never gets into it the whole livelong day. What there is of wall on the light side of the studio is painted dark, while the bare glass is, for the most part, obscured by curtains of very dark blue. On the shadow side of the studio the walls are of a light tint. One feature deserves special mention. The slope of the roof is but slight, and on both sides it is glazed; but, on the shadow side, the glass is covered in by seven or eight boards, their ends towards the apex of the roof. Under ordinary circumstances, therefore, they permit no top side-light to enter from the shadow side. At times—in winter more especially—light is, however, desirable from this particular direction. For this reason the planks are hinged lengthways, and capable, therefore, of falling or assuming any slope—and, therefore, casting more or less light—towards the object to be photographed. Two cords—one near each end of the plank or

board—permit of moving the plank, and either allowing it to fall altogether, so that it hangs edgeways, or of pulling up the flap flat with the roof, in which circumstance no light at all enters.

The dark-room is one of the best ventilated we have seen. There are two ventilating shafts, one on each side of the apartment, with pipes no less than eighteen inches in diameter. The shafts are not only bent at an angle, like a magic-lantern chimney, to keep out rays of light, but there is, moreover, placed at a short distance below the orifice of each, a dead-black disc, to make security more secure.

STUDIOS IN FRANCE.

M. ADAM-SALOMON IN THE RUE DE LA FAISANDERIE, PARIS.

M. ADAM-SALOMON died the week after Easter in last year, and it was on Easter Sunday and Easter Monday that we last had the pleasure of meeting him. Although suffering from impaired eyesight, he was then in good health and spirits, and talked hopefully of an operation for cataract which was to bring back to him his strong vision once more. On Sunday, a hot summer's day, he was in company with an old colleague, a doctor of medicine, and brother Chevalier of the Legion of Honour, and during a stroll together in the sunny garden among the odorous wall-flowers and fresh green chestnuts, there was a running fire of gaiety and jokes. They called blithely to one another among the trees, and rallied each other like schoolboys. "Where are you, *docteur*?" cried M. Salomon, lustily, for the doctor had seated himself in an arbour, out of pretence to avoid the artist's raillery. "Where you can't find me," was the other grey-beard's reply. With all the freshness of a lad of twelve, M. Salomon quizzed his friend about his cleverness, whereupon "*docteur*" replied that his hair had not grown white for nothing. "*Cheveux blancs*," cried M. Salomon, explaining to us what an impostor his friend was; "*il est un brun, avec la tête poivrée.*"

We like to recal the scene now the kindly heart beats no more, not only because it is one of the last and brightest reminiscences of a gifted artist, but because it shows how lightly his years sat upon the shoulders of Adam-Salomon. Everybody knows that he held high rank as a sculptor; but, skilled as he was in the use of the chisel, it was as a photographer that his fame travelled to the four corners of the earth. Strange to say, he did not begin photography till 1861—it was one of the last things, he said to us—and yet, in 1867, at the Paris Exhibition, we find him so far ahead of all other portraitists, that his position was undisputed by his own countrymen, and spontaneously acknowledged in every land.

But to return to our visit. M. Adam-Salomon comes down the gravel walk to unlock the gate for us. His beard is whiter and more flowing than it used to be a dozen years ago, when we first met the *premier* portraitist, but he is as genial, as warm, as winsome as ever. In his button-hole he jauntily wears the red ribbon of the Legion, and his manner has all the old gaiety about it. He calls out a blithe welcome as he rattles the key in the gate, and shakes hands again and again.

In his kindly hospitable fashion he has insisted on our taking déjeuner with him; but come early, he has said, for “à midi je vous chasse.” So between ten and eleven, this sunny April morning, we present ourselves at the little villa, so close to the green confines of Paris and the fortifications as to have been unsafe to inhabit during the investment of the capital by the Germans in 1870. The balmy air is redolent with the odour of wallflowers, and it is so warm that the house door stands wide open. As everybody knows, M. Saloman is a sculptor before he is a photographer, and evidence of his handiwork is here in the little garden, and in the handsome gallery we now enter.

A pleasant chat about friends and acquaintances who have visited him in Paris, or M. Saloman has met in London, revives recollections of that famous display of portraits in 1867, when he took the photographic world by storm. The long article by the *Times* special correspondent at the Paris Exhibition, in which a high tribute was paid to M. Salomon's pictures, our host still remembers with unaffected delight, as also the many other recognitions of his work that have come from Great Britain. His skill as a sculptor has been no less complete, and M. Salomon speaks with deep feeling of the homage paid to his work by the

English press, particularly in respect to the bust of Mr. Chadwick, C.B., exhibited two years ago at the Royal Academy. Unfortunately—and our readers will read it with infinite regret—M. Salomon's eyesight for some time past has been very defective, and has compelled him to put aside almost entirely his photographic work. "Here is my last essay at posing," said our host, showing an unmounted print; "I did it the other day, but I was able to do no more than pose." It is a standing portrait of a violinist at the moment of *attaque*. The chin presses the instrument, the arm is raised, the bow just touches the strings—the musician will instantly commence.

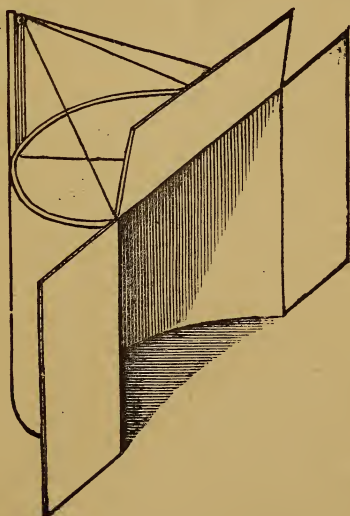
"It is a gelatine plate, of course, with a pose of three seconds," says our host: "I could not have secured that with collodion."

An exposure of twenty seconds he used to consider a short one in taking the brilliant 10 by 8 pictures for which he was so famous—pictures, as our readers know, not less delicate than they were brilliant. A portrait of Mr. Blanchard, which he took in Mr. Blanchard's own studio in London, is here, and M. Salomon shows it us with pardonable pride, for it proves how well he can succeed far away from his own studio and familiar surroundings.

On either side of the spacious gallery—furnished with rich Turkey carpet and handsome Louis XIV. furniture, its walls being deep chocolate—are examples of his skill as a sculptor. A bust of the late Pope Pius IX. is here, to model which, a journey to Rome was necessary. This is Guizot, full of force and vigour; and this Cousin, another noted French minister, a magnificent work in white marble. Earl and Lady Granville are to sit to our host as soon as his eyes are better, he tells us; at present he is engaged in modelling a bust of Thiers, which we are forthwith invited to see in the atelier. We pass into the garden, and thence into a large room where finished and unfinished work is on every hand. M. Salomon throws off a cloth, and before us, in dark plastic clay, are the familiar features of the late liberator of his country; the lips seem to speak, so full are they of life and vitality, and one can almost perceive a smile playing over the face of the benevolent statesman. It is a marvellous work. These grand models seem to point to the reason of our host's success in photography, for his portraits are essentially statuesque. Relief and plasticity is a marked, if not the principal feature in them, and when we are

further invited up into the photographic studio, we see unmistakable signs of M. Salomon's great endeavour to give a statuesque character to his work. Repeated accounts have in past years appeared of M. Adam-Salomon's method of working, but, for all that, our readers will forgive any repetition, we are sure.

The studio is on the first floor of a detached building in the garden, so that light from every side is available. "*A droite, à droite, je vous prie !*" cries M. Salomon, as we mount the wooden steps, for they are a little unsafe in places. The studio is very spacious, and very few curtains are made use of ; so roomy is it, indeed, that you might point the camera in any direction. The principal light is top-light, and here is the alcove or semi-circular background which M. Salomon has repeatedly used with such effect. It is some twelve feet across, and, inside, of a chocolate



colour. The way to use it is very simple, and it has the advantage of producing almost every effect of lighting. If need be, the model need not move at all. He stands or sits in the centre, and the semi-circular background is revolved, if we may so call it—shifted round a little to one side or the other—as the

photographer deems necessary. Thus the lighted side of the model may be contrasted with the shadow side of the background, and *vice versa*. Again, the background may be bodily advanced or receded from the light—the model remaining stationary—when another modification of the illumination is brought about. Many photographers have a bust or statue in the studio as a *corpus vile* whereon to make experiments in lighting, &c. M. Adam-Salomon, although himself a sculptor, with an array of these at his disposal, does not avail himself of such aid; he employs something more to the purpose. “Madame Tussaud’s,” he says, jokingly, as he pulls aside the curtain from an alcove. We see two life-sized figures dressed in black coats and trousers, and, to all appearance, habitués of the famous Baker Street establishment. These models M. Salomon employs for his essays in lighting and since he has here the contrast of black drapery and white features, which is the plague of the photographer, he knows pretty well that if he can succeed with these, he can succeed with live models.

M. Salomon is an indefatigable experimentalist; for some time he employed a red-glass camera in his work—this is, a camera with windows of red glass on top and sides—and he has still a good word to say for it. It was quicker in action than the ordinary camera, and in some circumstances, the slight greyness in the prints from negatives taken therein was not disadvantageous; but, of course, with gelatine plates any accelerating means of this kind are quite unnecessary.

All who have seen M. Salomon’s pictures know that these were never issued unmounted. In the same way as no effort was spared to secure in the highest degree results of modelling and harmony, so M. Salomon never neglected the smallest detail in finishing and mounting his pictures, with the view of securing the very best *ensemble*. His portraits were not only mounted upon glass, but rubbed with a wax or paste, the composition of which has already appeared in these columns, and which we repeat at the end of this article. No better “finish” has since been suggested, and Salomon’s encaustic paste still finds a ready sale on the Continent and in this country. M. Salomon told us he had himself purchased it at various times, and laughingly alluded to the grave protestations of a shopman to whom, on one occasion, he had expressed doubts as to the efficacy of the compound.

“When in London I purchased, too, some pictures of myself,”

said M. Salomon, recounting another anecdote. It was "*dans la cité*," and naturally he desired, before making the purchase, to know whether the portrait was *ressemblant*. "*Très ressemblant*," was the shop-keeper's assurance; "and on the strength of his word," continued M. Salomon, "I purchased half-a-dozen of the pictures. But from that day to this I could never trace the resemblance myself."

Here is the composition of the Salomon paste, and manner of employing it:—

Pure virgin wax	...	...	...	500	parts
Gum elemi	...	...	...	10	"
Benzole	...	...	...	200	"
Essence of lavender	...	...	...	300	"
Oil of spike	...	...	...	15	"

Melt the whole on a water-bath, mixing thoroughly, and strain through muslin. Or the elemi may be dissolved in the solvents, and the melted wax added after filtration. To make it thinner, add a little more lavender essence.

The encaustic paste is put on the print in patches in three or four parts, and then rubbed with a light, quick motion, with a piece of clean flannel. If a thick, rich coating be desired, a very light pressure in rubbing is used. In the case of a retouched print, the rubbing should be very light.



THE MAISON LEJEUNE IN THE RUE ST. HONORE.

WE have always had a sneaking fondness for the Rue St Honoré. Despite the grandeur of the adjacent Rue de Rivoli, and of the broad Avenue de l'Opéra, with its massive shops and electric lamps, the Rue St. Honoré is quite competent to hold its own. From its less aristocratic end, where old-fashioned shops of the true Parisian type are still to be found—where salads, cheese, apricots, sausages, and other comestibles, are seen in queer little windows, where restaurants flourish for the bourgeoisie, with the steaming kitchen on the threshold, so that customers may make up their minds as to the quality of the viands before entering—we repeat, from this unaristocratic quarter right away to the Faubourg, where the Elysée and the British Embassy are

located, this favourite street of ours is full of interest. We are not particularly aged, but still old enough to remember the days when diligence travelling was resorted to on many of the French highways, and we have seen the heavy yellow vehicles swing out from under that archway in the Rue St. Honoré, which before the days of railways was the main point of arrival and departure with Paris visitors. The word "Messageries" still appears above that archway, and beside it, in newer letters, the word "Nationales"; it was "Messageries Imperiales," we remember, when we first saw it, a quarter of a century ago.

Very nearly opposite that hostelry, dear to English visitors, the *Hotel de Lille et l'Albion*, is a lofty building of white stone, wherein is situated the atelier Lejeune. The present head of the firm is Monsieur L. Joliot, and to him, both on behalf of our readers and ourselves, we tender thanks for a hearty welcome, and permission to visit one of the very first studios in the French capital. That he had nothing of novelty to exhibit, was an assurance he gave us over and over again; but, that we might judge for ourselves on the subject, we were at liberty to go where we pleased.

M. Joliot's establishment is on the second floor. Two handsome salons, furnished with excellent taste, are at hand for the reception of visitors, and from one of these, half a dozen carpeted stairs lead to the studio. M. Joliot has a speciality in the shape of the *Cartes Russes*, which attracted considerable attention at the last International Exhibition. They are bust vignettes on a black ground. The style is especially suitable for ladies, and is pleasing to a degree. It was, indeed, these *Cartes Russes* that decided us upon an early visit to the Maison Lejeune, for, strange to say, although the cards are well known in Paris and St. Petersburg, at home they are comparatively unknown. The Promenade or Panel portrait is also in favour with M. Joliot's customers, and we may here mention that, as with us in England, the Parisians have not yet made up their minds in respect to a general name for the format; "Portrait de Paris" is one of the titles by which it is known.

M. Joliot believes that there is fashion in photography as in everything else. The public are capricious, and they would just as likely take up with a style because it is fashionable, as because it is artistic and elegant. From the circumstance that

the present costume worn by ladies is well rendered in the panel portrait, this cannot fail to become a favourite style, if for no other reason. Unfortunately, said M. Joliot, the recent seasons have brought satin very much into fashion for ladies' dresses, and of all materials that plague the unfortunate photographer, this shining fabric is the worst. M. Joliot takes the liberty of advising his sitters as to the nature of their costumes; in his circular he says, "Costumes of white, blue, violet, mauve, rose, and light grey, should be avoided, except in the case of *Cartes Russes*, when these tints are especially to be chosen, since they are the only ones giving good results. Moiré antique, black velvet and satin generally produce unsatisfactory effects; black, dark grey, green, yellow, chestnut, and brown, are good photographic colours."

M. Joliot admitted, however, when we referred to the subject of drapery, that the ideas of photographers had of late years undergone a vast change, and that many colours that were formerly regarded by the photographer with dislike, are now chosen in order to secure effect. To produce the best result upon a dark background, as in the case of his favourite style, there was nothing equal to "une laine claire" (a light merino or cashmere); and even colours like blue were not to be despised, since they were reproduced of a light tint, without the glare which white material shows if not carefully handled. Silk was very agreeable in a photograph, but was not rendered so well as woollen fabric.

M. Joliot's studio is exceedingly roomy. The dressing apartments open almost immediately into the studio, and further on is the laboratory. The studio is divided into two by a huge canopy, under which the cameras stand; the latter are thus capable of being directed to one end of the studio, or the other. One portion of the studio is devoted to the sole production of the vignetted portraits on a black ground. Here there is but a single background, of a dark red, so dark that it scarcely appears red at all. To produce the *Carte Russe*, the sitter is placed some eight feet from this background, so as to permit plenty of side light to intervene between it and the model, the result of which is that the finished portrait has something of a Rembrandt look, the features rounded, and standing out well in relief. On the shadow side of the sitter either white or blue curtains are arranged, to reflect back the light, and not to permit too much shade on this side of the face. A negative taken under

these circumstances does not require to be manipulated at all so far as face and shoulders are concerned, since these stand out boldly from the black ground when the negative is printed; but some little skill is necessary to cut off the bust and print the paper black below the portrait. But this printing is of a "fond dégradé," M. Joliot assured us; is a matter soon got over with a little practice; and it is altogether a subject of secondary consideration. A final darkening round the margin of the print finishes the picture. Portraits produced in this way, especially of ladies in light summer or ball-room dress, are exceedingly effective.

At the other end of the studio ordinary portraits are taken. M. Joliot employs Seavey's backgrounds. "No doubt our Paris artists could paint them as well, if they gave themselves the trouble, but they won't, and hence we have to go to America." M. Joliot does not stretch his backgrounds or hang them on rollers. There are half-a-dozen wires running across the studio at the end, and the backgrounds, provided with hooks, hang upon these; they are slidden backwards and forwards, into position, or out of it, according to the whim of the photographer.

The lighting is from the north, and there is so much of it that in summer weather blue blinds have to be exchanged for white; there is but a foot of wainscoting, the side being of clear glass, and the sloping roof of ground glass. The laboratory is in two compartments, the one for coating and sensitizing plates, and the other for developing. Everything here was in apple-pi order. M. Joliot employs the vertical dipping bath, and put in a good plea for its use. He can cool or warm his baths with very little trouble. His bath frame has three compartments, into which you can fit three baths if you like, the baths fitting very loosely into the compartments; he, however, only puts two glass baths into them, leaving the centre compartment empty, and it is by means of this centre compartment that he maintains his bath solution at any temperature he likes. In winter, lukewarm water may be introduced, in summer time a little ice. The sides of the compartment being perforated, the temperature of the baths is soon lowered or increased. In this way he always works under the same conditions. As M. Joliot pointed out, it would be impossible to keep horizontal baths at an equal temperature by means of arrangements of such a simple nature.

In the developing room was another arrangement worthy of

note. The developing solutions were kept in large glass barrels, standing upright in a row at the right hand of the assistant. Here were the iron, pyrogallic, and silver solutions ready for use, the vessels provided with glass taps, underneath which stood suitable glass measures. A handle at the left hand of the assistant further provided for augmenting and lessening the light that gained admittance into the dark room, so that he could control the illumination at any moment, and to any degree, without moving from his place.

At the Maison Lejeune the terms are :—

15	Cartes-de-Visites, plain (2 poses)	...	30	francs
15	„ vignetted „	...	30	„
12	Cabinets, plain or vignetted	...	60	„
15	<i>Cartes Russes</i>	... ..	45	„
15	„	... ..	72	„



MM. BENQUE ET CIE. IN THE RUE BOISSY D'ANGLAS.

A HANDSOME salon on the first floor is a fitting reception room to the studio, which of late years has attained such high reputation, both in Paris and in Milan, as that of MM. Benque et Cie. Fluted columns, draped with rich maroon curtains, are at the entrance to this apartment, into which not a ray of direct sunlight enters. All is soft and sombre within. There are extensive windows, but these are hidden by loosely festooned drab silk, so that while there is plenty of illumination, it is subdued and yet refulgent. The walls are of chocolate brown, the damask chairs and furniture gold and black, the fittings rich and handsome. This fine carbon portrait in frame complete, standing a meter high (39 inches) is a speciality of the firm Benque et Cie., and sells for a thousand francs. These pictures on the table are what is termed the "Paris-portrait," similar in height to the panel or promenade, but half an inch broader, a very attractive size, but still, to our thinking, not so elegant in its proportions as the promenade. Of cabinets, there is also a collection, not large, for we believe that there are not more than a score of photographs in the whole salon. Two or three cartes are here also, but during the past three months, our host tells us, not a single carte

picture has been taken in the establishment. Here, too, we find Madame Nilsson, not in a frame, but in the flesh; she is looking at some portraits of sister artistes, after undergoing a lengthened sitting. "We have just taken one hundred clichés," our friend whispers, "and within the space of an hour and a half."

Before we walk upstairs, we are presented with a card of terms. Here it is:—

12 Cartes-de-Visite	...	...	30 francs
The dozen following	...	...	20 "
12 Cabinet Portraits	...	...	80 "
6 " "	...	...	50 "
The dozen following	...	...	60 "
12 Paris Potraits	...	...	120 "
6 " "	...	...	80 "
The dozen following	...	...	100 "

In the Benque establishment, gelatine reigns supreme. "Do you develop at once, or in the evening?" we ask. "Always in the evening—we are now so confident of our results; of those hundred clichés just taken of Madame Nilsson, not one will be developed till to-night." The development is done by artificial light, by means of a gas-burner behind ruby glass, a convenient tap permitting the photographer to heighten and lower the jet at will. The developing, too, for the most part is done mechanically. As soon as some idea has been obtained of the exposure of the plate, and the time and strength of development, half-a-dozen clichés are put together into a rocking tray. The developer is poured over the films, and then the tray rocks to and fro by itself, kept in motion by a heavy pendulum that swings underneath. It saves a world of trouble, our host tells us, and produces very uniform results. We always like to take the sense of photographers on the development of dry plates, and we put the question whether pyrogallic or oxalate treatment is preferred. "Oxalate, toujours — Oxalate toujours" — is the energetic reply.

The studio is large and roomy—the largest in Paris, our friend says; at any rate, it measures fifteen metres (nearly fifty feet in length). There is nothing particular to be noted about the lighting; top-light is the dominant light. The walls are of very dark brown, and we remark upon this. They are dark, admits our host; but when they are again painted, we shall colour them

darker still. Large plates are in general use at the Benque establishment, and large cameras. As a rule, six poses are taken on one plate. He mentioned the other day the circumstance of Madame Judic being pourtrayed 132 times in this studio at one sitting. She was at the atelier for two hours only, and, during that time, changed her dress four times. Twenty-two poses were taken, of each six clichés, with an exposure of about three seconds. The negatives were developed at night, and there were only two technical failures. "*Elle ne voyait plus,*" when she went away after the ordeal, our host remarked of the fair comédienne. Certainly, such rapid work could not have been undertaken before the days of gelatine. There is no dark-room adjacent to the studio; the plates in their slides are sent up a shaft from the laboratory below, and delivered close to the assistant's hand in the studio, after the manner of Messrs. Window and Grove's studio, described on another page. The exposures are made by means of the ordinary pneumatic-Cadett shutter.

In the enlarging-room there is one point worthy of mention. The camera is disposed pretty well as usual; but just in front of the transparency is placed a swing looking-glass or mirror, perhaps twenty inches high. This permits, in a most convenient manner, the concentration upon the transparency of light that comes through a small opening in the wall, and if the mirror is turned to its proper angle by hand, the hand being never quite steady, no partial lighting is likely to ensue.

There are two printing-rooms, and MM. Benque send the negatives to one or the other, according to their density. Thus in the top printing-room, which is on the roof, the denser clichés are to be found, and those which will bear strong light; while in the more subdued light of the lower printing room are located such clichés as require more delicate treatment. From 1,200 to 2,000 prints are produced here every day, for the firm has now a large publishing connection, and their portraits go to every capital in Europe. Printing to this extent would be impossible in a London atmosphere, and for this reason our big metropolitan firms have usually an establishment in the suburbs for the purpose. But in Paris they burn charcoal more than they do coal, and, moreover, when this is used, it is of a much less sooty character than that employed in this country.

Starch, prepared fresh every day, is invariably employed for mounting at the Benque establishment; where so much publish-

ing is done it is a matter of imperative necessity that the mounting should be depended upon, especially as black mounts are largely used just now. We are glad to hear, by the way, that of late these black mounts are more satisfactory than was the case a short time ago. Numerous cases of fading were then rife, and the cause, as our readers know, Mr. Spiller was able to trace to the presence in the mount of a considerable quantity of sodium chloride, or common salt. The test to discover this—namely, the adding of a few drops of nitrate of silver solution to water in which one of these has been steeped for some hours, and observing whether any turbidity results—is so simple that any photographer can make use of it for himself.

Besides making itself known through its publications, the firm also adopts the practice of exhibiting its works largely in Paris. The Boissy d'Anglas, although a turning out of the Faubourg St. Honoré, is not a very frequented thoroughfare, and hence visitors to Paris might well escape seeing the studio. MM. Benque et Cie. have, therefore, opened an exhibition in the Rue Royale, that familiar street leading from the Madeleine to the Place de la Concorde, and here a display of the firm's finest work is exhibited. A *pièce de resistance* is always present in the form of a scene from one of the Paris plays. Whatever happens to be popular on the boards for the moment, is here illustrated.



M. NADAR IN THE RUE D'ANJOU ST. HONORE.

IN the dark days of the Paris siege in 1870-71, when the fair capital was encircled for nearly six months as by a girdle of iron, two photographers brought hope and comfort to the besieged citizens. The one (M. Dagron) showed with what rapidity and facility despatches were to be photographed upon pellicle, and in such a way that a pigeon could carry a thousand of them at its tail; and the other (M. Nadar) as captain of a balloon equipment, demonstrated how aerial photography could be practically applied for scouting. "A la nouvelle de l'approche de l'armée Prussienne," we read, "sous les murs de Paris, M. Nadar organisa à Montmarte le premier poste de ballon captif pour observer l'ennemi."

In the words of our neighbours, MM. Dagron and Nadar deserved well of their country, and although their brother citizens would wish to forget as speedily as possible those anxious hours of misery and bloodshed brought so vividly home to them, they still remember with gratitude the aid which these gentlemen brought at a time of dire distress. It is an ill-wind that blows no good, and among other lessons that the siege of Paris taught was that a regular "poste aérienne" could be established now-a-days by the aid of photography and balloons, and that the latter, moreover, afforded an excellent means of observation or reconnoitring for an army in the field.

Our host, the captain of the aerial scouts, in the red blouse in which his stalwart figure is usually attired "at home," presents a handsome figure enough; M. Nadar is still in the prime of life, his fair brown moustache and bright eyes conveying the idea of strength and determination, while his broad shoulders tell that he can both do and dare. His aerial photography experiments, he tells us, have cost him 30,000 francs; he considers the problem, however, practically solved, and if his balloon pictures are not perfect in every respect, they require but little more attention to detail to render them so. But one fine example, we may say at once, leaves little to be desired. It is a picture to which the late Sir Charles Wheatstone referred us on one occasion, during a discussion upon aerial photography, as the best result of its kind. Balloon photographs are very rare, and, besides those of Nadar, we only know of one tolerable success, namely, a picture of Boston, U.S. The pictures of M. Nadar were secured upon three-inch plates with the briefest of exposure, and have been enlarged to something like twenty inches. The most successful of all, of which we have spoken, was secured at a height of 320 metres. There is, of course, something of a haze, due to the flood of light; but we see the main buildings of Paris and the heights around with map-like distinctness. To the extreme right, is just a corner of the Arc de Triomphe; there are the Eglise Russe and the Parc Monceaux, with twenty spires and domes that a Parisian would recognize and call by name. Great difficulty was experienced in overcoming the gyrations of the balloon; but, after all, it is rapidity of exposure, according to M. Nadar, that is the key of the problem.

The Nadar establishment is a very extensive one. Passing through the corridor you enter a fine square hall, which probably

measures forty feet each way. Here are pictures of Paris, under the earth and over the earth, the former, representations of the famous catacombs, secured by electric light. M. Nadar, junior, was good enough to accompany us on a tour of inspection, and chatted affably over prospects of photographers and their position. The *carte panneau*—the panel portrait—was already in such requisition at the Nadar establishment that quite one-third of the work done was in this form. Besides this new format, there was the *carte Nadar*, a very large and handsome format, about the size of two panel portraits placed side by side. The price charged for panel portraits was 120 francs the dozen, while as much as 200 francs per dozen was asked for the *carte Nadar*. Thirty francs, for which the sitter received fifteen *cartes-de-visite*, was the lowest fee charged.

To ascend from the magnificent entrance hall a lift is provided, which takes the visitor to the dressing-rooms and studio. The former are tastefully fitted up, and the studio is large and lofty. So lofty, indeed, and so much light is there, that blue curtains are stretched across at some distance from the roof to lessen the illumination. These blue linen curtains are strung on wires, so as to be manipulated with ease. There is very little skirting-board or wainscoting, the side window coming down very low. They like dark backgrounds at the Nadar establishment (those we saw were all of a blackish drab), and, to prevent the flooring being seen in a standing portrait, or the line of the background where it touches the floor, sand is thickly strewn about. The effect of the latter was remarkably good in the panel portraits we saw.

M. Nadar fils discussed with us at some length the difficulty of securing talented assistants. It is not a question of money at all, he assured us; good competent photographers, who are artists as well, could command high prices. The pay of assistants *du premier rang* was 500 francs per month (£240 per annum); but he knew a case—an isolated one, it is true—in which *mille francs*, or double the above amount, was paid. In the principal studios in Paris, Vienna, and Berlin there were assistants of all nationalities. But while the Germans, some time ago, by reason of their skill with the retouching pencil, were to the fore, the Italians now seemed to be making way. These rates, of course, only referred to first-class men; but they were such as well-known studios paid. Unfortunately, the

number of talented assistants available was very small, for he who secured a good man took care never to lose him again. A percentage of the profits, or sometimes an offer of partnership, was necessary to retain him. The studios of Vienna, Paris, London, Berlin, &c., in the first rank were, after all, not very numerous, and consequently you might tell the number of competent assistants upon your fingers.

As to photographic apparatus, said M. Nadar fils, touching upon another point, you have it all your own way in England. "I am coming to London in a little while, and for no other reason than to purchase instruments and apparatus." "But don't you find our apparatus rather more expensive than what you buy on the Continent?" we naturally asked. M. Nadar did not think so. "Your work is so good that it always pays to buy it." So our opticians and camera-makers need not despair yet, and we hope sincerely that they may long continue to enjoy the same reputation. That they have been in the van for years past is well known. Ten years ago, when on a visit to Dr. Vogel, in Berlin, we well remember the ecstatic delight with which one of the worthy doctor's pupils spoke about the new camera that was coming all the way from England. We often think of him now, when we see the shining mahogany, and its brass and ivory fittings, and wonder if our sanguine friend in Germany was satisfied with the apparatus which gave him so much anticipatory pleasure.

The Nadar establishment is singular for the fact that no *cartes emallées* issue from the premises, a style, as we have before remarked, which is still exceedingly popular in Paris. For the glaze and embossing, the public are quite willing to pay half as much again, and thus both customer and photographer join hands. But M. Nadar is evidently bent upon pushing the panel picture instead, and, as the portraits of a large number of celebrities have recently been published in this form, it is daily growing more and more popular. At the same time, 120 francs is not an amount that all the world and his wife is ready to pay; although it always seems to us that a sum that visitors grudgingly give at home is freely disbursed in the French capital.

Those who visit the Rue d'Anjou will say that M. Nadar has given up the command of his war balloons to some purpose. He seems to be quite as successful in his peaceful pursuits here, as when scouting in the air with the Prussians, at the walls of Paris—as good a man behind the camera as before the enemy.

M. LIEBERT IN THE RUE DE LONDRES.

Not very far from the Ouest railway station, with which passengers coming from England by the Newhaven and Dieppe route first become acquainted on their arrival in the French capital, is the new studio of M. Liébert. The establishment is noteworthy in this respect, that it has been built expressly for photography, and with a view to meet the requirements of the art and its votaries. For some reason, which we were not clever enough to discover, M. Liébert calls his studio by the name of "Photographie Americaine," for whether it is like an American photographic establishment or not, we are unable to say. It is a lofty building in the Rue de Londres—M. Liébert has a formidable rival near in the person of M. Walery—and from cellar to basement it is taken up with photographic requirements. Downstairs, in the back portion of the house, the toning, fixing, and washing of prints are carried on, operations that are thus conducted with little change of temperature; while in front are situated the engine and electric machine that supply M. Liébert with illumination at night. The engine is one of the Otto gas engines, which bid fair to supersede boiler and steam engine altogether in cases where limited power only is required, and this in a dwelling-house or populous locality. There is no need to light a fire an hour previously, for the purpose of getting up steam, nor of enlisting into your service a trained engineer learned on the subject of pressure guages and boiler fluids. When you want to begin work, you simply turn on the gas, light a single jet, give one of the wheels a swing round, and the engine is started. The consumption of gas in an engine of about one-horse power is said to be about threepence per hour. M. Liébert has a Gramme machine for grinding out his electricity, and this is then conducted above to the first floor, where the electric light studios are situated.

We now ascend to the ground floor. Here are the mounting room—M. Liébert employs starch mixed with a little gelatine for mounting—the lobby, and entrance hall. The visitor walks upstairs to the first floor, the passage and staircase windows tastefully set with photographic transparencies, produced upon carbon tissue. We now reach the bureau, and right and left are two handsome salons filled with pictures of every kind and des-

cription. M. Liébert, besides being an author of some note—his “*Photographie en Amérique*” being a most trustworthy handbook—is a thoroughly business man, and marches with the times. Portraits are taken day and night, and there is a wide choice before the customer as to the mode of finishing. The other evening, M. Maurel and a party of brother and sister artistes visited the studio in costume after their performance at the Grand Opera, to be portrayed by the electric light, and thus saved the trouble of making a morning appointment. If ladies and gentlemen tire of looking at pictures, there are other amusements open to them in the establishment. M. Liébert provides a “*Salle de Billard*” and a “*Terrasse d’Agrément*” for the convenience of his clients while waiting, and no doubt if they asked to be accommodated with a croquet green, or with a lawn-tennis ground, M. Liébert would have sufficient enterprize to provide these too. Indeed, for a “*Photographie Americaine*” to be without an American bowling alley is already a glaring defect, we beg to point out. Only, the great difficulty in providing luxuries—as, no doubt, M. Liébert has found out by this time—is to know where to stop; however this may be, our host draws a hard and fast line at billiards just now.

Enamelled portraits, or *cartes emailées*, are here very much in vogue, and so is the new panel portrait, a pair of which M. Liébert presents us with, taken by electric light. He has two electric-light studios leading out of the salons, the one for vignettes, and the other for plain portraits. The reflector, which is hoisted on high at one side of the sitter, is a huge basin of white paper measuring three or four feet in diameter, the electric light being thrown into this receptacle by a little saucer-shaped reflector placed against the electric spark. The rays are thus thrown into the interior of the large white reflector, to be cast back again upon the sitter. M. Liébert can get a good panel picture with the electric light in five seconds if he uses a gelatine plate, but an exposure of not less than forty seconds is necessary in the case of wet collodion. The pictures M. Liébert was good enough to give us we have very carefully examined, and they are certainly little inferior to results obtained by daylight.

Before proceeding upstairs, we secure a card of terms at the bureau. The *carte emailée* is so much a matter of course here that it occupies a very prominent position in the list of prices at M. Liébert’s establishment.

Cartes, per dozen,	20 francs,	or Enamelled,	35 francs.
Cabinets,	„ 40 „	„	65 „
Cartes, per hund.,	100 „	„	220 „
Cabinets,	„ 225 „	„	425 „

The panel portrait is charged at the rate of a hundred francs the dozen, not enamelled.

It will be seen that a very considerable charge is made for enamelling—we will describe M. Liébert's *modus operandi* presently—and it is for this reason that the style of portrait is humoured by Parisian photographers. “As an artist,” said M. Liébert to us, very frankly, “I dislike them much; as a man of business, I regard them as a very good thing. The public are enchanted with them; they like the high glaze and finish, for it flatters their vanity to make them appear like the superfine pictures we see on bonbon boxes, and I am not the man to stand in the way of my patrons.”

There is little to remark in M. Liébert's studios; he has two, a large one fitted for the taking of ordinary portraits, and a smaller one upon the roof, and, therefore, with plenty of light, for the special treatment of children, and where shortness of exposure is the main desideratum. It was very hot during our visit to the studio, but, strange to say, in M. Liébert's studio the temperature was comparatively cool. And for this reason; by a clever contrivance water was permitted to run down the roof and sides of the studio, not in a torrent, but in a thin flowing and continuous stream, which had the effect of effectually cooling the atmosphere within. A sound roof is obviously necessary if such a system is made use of, but in the case of M. Liébert's studio not a drop of moisture found its way between the panes.

M. Liébert believes in plenty of room in his dark laboratory; for it is without exception the largest apartment of the kind we wot of, if we leave out of consideration the roomy laboratories of the Autotype Company at Ealing. Only those who are cramped all day long in close dark closets can appreciate to the full a spacious dark room where the air is cool and there is plenty of it. It opens, too, into the cooler part of the glass room, as should be the case in well-constructed studios. Considering that assistants have often to remain for hours together coating and developing plates in the dark room, it is surely a wonder that so little attention is usually paid to its temperature and ventilation.

Since the production of glazed photographs, or *cartes emailées*,

still receives so much attention in Paris, we make no apology for referring once more in these columns to their production. The method of preparation recommended by M. Liébert is as follows:—Some plates of glass (patent plate) are carefully cleaned; they are either rubbed with a little powdered talc, or with wax dissolved in ether; but, better still, the edges are straightway covered with fresh albumen solution laid on with a brush. After drying for a quarter of an hour or so, normal collodion is applied, to which a few drops of hydrochloric acid have been added, the acid, however, being only used when neither wax nor talc has been applied to the glass. The plates thus coated are put carefully away to dry, while the prints are being prepared.

These prints are first dipped into warm gelatine. One hundred grammes of good gelatine are soaked in a litre of cold water for an hour, and then dissolved by the aid of a water-bath. The solution is filtered warm through a piece of muslin into a vessel standing on the water bath, and thus maintained at a warm temperature, in which condition the gelatine must remain during the whole process. A collodion plate is coated with some of this gelatine, and then one of the prints, which have been dipped into the warm solution also, is placed face downwards upon the glass surface. (The carte or cabinet print, by the bye, should have been trimmed first of all.) Then a sheet of cardboard, previously dipped into warm water, is laid upon the print and pressed down by means of a thin piece of waterproofing, which has also been kept in warm water.

A stout strip of glass, such as used for squaring, is now energetically drawn to and fro across, with its angle against the waterproof, and in this way all air-bubbles are rapidly got rid of. The waterproof, after this thorough manipulation, is removed, the plate is put upon a stand, and allowed to dry in a highly heated chamber. At the end of this period the print is cut round with a sharp knife inside the border of albumen, and will then leave the glass of itself. It may be embossed in a press, or finished in its present condition.

Instead of thin cardboard, successive sheets of paper, all dipped into the warm gelatine, may be laid upon the print to mount it, a plan preferred by many. Finally, the *cartes emallées* should have a fly-sheet of tissue paper attached to them to protect the surface as much as possible.

AT THE PREFECTURE DE LA POLICE IN PARIS.

A stone gateway, with a red flag drooping over it, is pointed out to us as the Préfecture. The armed sentry in front asks no questions, so we pass on under the arch into a cheerful courtyard smoothly asphalted. We bear a long, official-looking document by way of introduction, and this we keep ready to hand, lest some sudden attempt at arrest be made, before there is time to show our credentials. Fortunately there is no fear of this. A policeman in the courtyard bars the way for the first time; but he is anything but a dangerous character. He is disposed to be argumentative, though, and in the end gets very excited over the address on the letter. It is for the chief of the Paris detective department, but, unfortunately, the name has been written with a *y* instead of an *e*. We point out that probably this will make no difference—it is the same thing. “But it is not the same thing,” is the hot reply. “Cet *y* grec, la,—what does it mean?” As he taps at the “*y* grec” excitedly, we carefully look at it again, but can afford no other explanation. “Dites donc, M’*elle*,” says the policeman, turning to a young lady who is quietly sewing at an open window in the court-yard; “have the goodness to look at that letter.” The young lady reads the address, and thinks it is all right. “Mais cet *y* grec,” responds the guardian of the law, still warmly. The young lady calmly thinks with us that it does not matter much, and in these circumstances the policeman gives the point up, and permits us to proceed.

Upstairs to the top of a lofty building and we enter an ante-room, where several stern-faced men, clothed from top to toe in sombre black, are sitting at a table. We perform our best bow, and present our credentials. No one makes an observation, but we are carefully scanned, and then ushered into a salon, and the handle turned upon us.

It is a salon comfortably furnished, the chairs and settees uniformly covered in dull, green cloth. There are no nick-nacks beyond a clock, which ticks solemnly. The walls are bare; the sideboard is bare; but on the table are two solitary objects, an inkstand and a little bowl of sand, for the instant drying up of writing, so that you could be sent to the Bastille—if there were one—on the spot. Time goes on, and we wait a good half hour by the clock in the salon vert. We begin to wish we had read

that letter of introduction before we presented it. "Lock up the bearer," or "The gentleman being rather inquisitive, keep him for the morning and let him go," might have been inside. We have plenty of time to think over the insanity of practical jokes, and the silliness of some people who continually practise them.

Presently the door is opened, and one of the solemn black greffiers beckons us. Without a word we follow him down one passage and up another, until he throws open a door, and we are in the presence of the chief of the Paris detective police.

A courteous gentleman, still young, with a smiling face and friendly manner, we find him, this head of the secret machinery of the gay capital; he is good enough to place himself entirely at our disposal. "I will accompany you through our photographic establishment myself, and you shall see everything that interests you."

He is as good as his word. He puts on his hat, and leaving word with one of our former solemn gaolers that he is gone to the photographic establishment, accompanies us down several flights of steps. We cross a yard, and perceive through an open door the dark forms of policemen, ready armed and accoutred, lying at full length over the floor in various attitudes. "La poste," explains our friend—it is a force ready to turn out for duty at any moment. We reach at length the basement of the building. Here all is prepared for our reception; we had evidently been kept waiting until the rooms were put into apple-pie order. An officer of the rank of inspector of police, under whose direct charge the rooms are placed, receives us, and in his company we proceed to make the inspection.

This is the mounting and finishing room, and here are batches of prints—carte size—ready for issue. Let us look at this double row of portraits on the table, first of all; they are copies, and taken obviously from portraits more or less good. They are of men, some of them old, and some very young, habited in ordinary dress, and for the most part very untidy about the hair and beard. There is not the trace of a razor among them. Hairy individuals, who have an aversion to the barber, and whose features would evidently be improved by the lavish application of yellow soap, they are most of them the counterparts of whom may be seen every day in the back streets of Soho. "Nihilists," the chief briefly explains.

Affairs in Russia have made European Governments extra cautious about the unsoaped and unshaven of the community; and this collection is the result of extensive research by the police of Paris.

"*Enfants perdus*," explains our friend a second time, for we have taken up some pictures of children who seem innocent enough. These portraits are exceedingly useful in trying to find out parents; the police carry the pictures into any quarter in which the children are likely to be known, and show them about. Photography has been found a most efficient aid in restoring children to their parents, or rather in discovering the whereabouts of those who have deserted their offspring.

These pictures are scarcely so attractive. The dull look of remorse borne by most of their sad, still faces is terrible; they are portraits taken at the Morgue, where all unknown dead bodies found in Paris are carried. A large number of copies are printed if foul play is presaged, but every unknown body is thus recorded.

This heap of untrimmed and unmounted portraits of men and women represent the daily takings of the Paris police. They will be mounted, sorted, and presently put upstairs in the Record Office. They are ordinary persons enough, the sitters, of a low class most of them, but with nothing at all to show they are criminals. As portraits they are admirable, however, and we may at once say that the work at the Préfecture is simply very good indeed. The manner of proceeding by the Paris police is as follows:—Everyone charged with crime or misdemeanour of a grave nature, who is brought to the Préfecture, is photographed forthwith. It does not matter whether in the end he is proved innocent or guilty, he is taken to the studio, which is situated in the same block of buildings as the court. As the prisoner quits the court he is at once brought before the camera. On an average, forty to fifty portraits a day are taken, and these are forthwith printed; some few may afterwards be cancelled, where innocence is manifest; but if there is the least suspicion, the portrait is pigeon-holed; it may be difficult to take the likeness a second time. In this country, as most of our readers know, it is not permitted to photograph an unconvicted person. Gelatine, by the way, has not yet found its way to the Préfecture; as the portraits are only carte size, however, an exposure of five or six seconds usually suffices.

The French criminal portraits are certainly more valuable than our own. The men and women in Paris are portrayed as they usually are in everyday attire, and with all their peculiar personalities about them, as to manner of wearing hair, beard, &c. Most of our portraits, on the other hand, depict the men shaven and shorn, in the grey convict dress, and therefore as they are never likely to be seen outside the prison walls. In France the governors of prisons care little about the appearance of their charges; it rests with the detective and police department to look after criminals at large, and these authorities, to assist themselves, prefer to have portraits of the men and women as the latter are seen every day in the streets.

We go upstairs into the Record Office. There are two huge presses, containing in all the portraits of 40,000 bad characters. In one press are portraits arranged according to names, in the other according to crimes. In deep pigeon-holes fit long narrow trays, full of cartes-de-visite. Each tray measures about two feet in length, and when slipped into the pigeon-hole, it shows on its outward face certain letters of the alphabet. The first is marked A—A M, and it contains portraits of criminals whose names begin with these initials. The cartes are loose in the long box, but all in order, so that a man or woman may be picked out at once. Here, in the other press, the pigeon-holes are divided into groups, over each being the nature of crime, such as *assassinat*, *vol*, *expulsés*, *mœurs*, &c. The chief, at random, takes down a long box of the *expulsés*, or banished ones, and looks them through. We divine what he is doing. Out of compliment to ourselves he is trying to find an Englishman among them, but his search is in vain. Italians turn up without number, and Austrians and Russians, but no English. We suggest that the search is impossible—there are no bad Englishmen. “Attendez,” says the inspector, and he goes to work at another box. But *chef* and *sous-chef* are equally unfortunate, and in a few minutes laughingly give up the job. The name and other particulars are scratched on the negative, so that they print in black upon the portrait, and are quite inseparable. This is a neater and better plan, we think, than chalking the particulars on a black-board and photographing the latter with the convict, the plan adopted in Great Britain.

Another feature in the photographic establishment is the enlarging of handwriting, to establish, if possible, identity of

character between an acknowledged hand and that upon a spurious document. Here is a name written across a receipt-stamp enlarged ten or twelve times; there is no difficulty about examining the giant up and down strokes in every particular. If any writing is characteristic of a man, the character comes out in a marked manner as soon as enlargement takes place. Any slight spluttering of the pen in making an upstroke, or any particular flourish or defect about certain letters, is at once detected. On the walls of the Record Office are many examples of enlarged handwriting, which have served to discover forgery, and of which the police-photographers are very proud; they attach, indeed, exceeding importance to this feature of photographic detection.

The printing room and the washing room offer little of importance; they are well arranged, exceedingly clean, and judiciously appointed. But before taking our departure, the chief invites our attention to the photographic carriage, which is a valuable item of the establishment. It is a fine vehicle, painted black within and without, about the size of an ordinary police van. It is fitted as a dark laboratory, with sinks, shelves, handy seats, and all conveniences. In cases of fire, murder, and serious crimes, a view is taken of the scene or surroundings, and if a body is found under suspicious circumstances, a photograph is taken on the spot, if possible, before the body is tampered with. It is to perform duties of this description that the van is made use of; and such importance does the Préfecture attach to photographs secured on the spot, that it did not hesitate to spend a sum of 7,000 francs on the vehicle. On the whole, the police photographic establishment in Paris is most complete; and it is not only a model establishment, but one that has not its counterpart in any other country.

STUDIOS IN PRUSSIA.

HERR J. C. SCHAARWÄCHTER IN THE FRIEDRICHS-STRASSE, BERLIN.

A NEAT little office, with counter and show-cases around the room, forms the ante-chamber of Herr Schaarwächter's studio. Herr Schaarwächter enjoys a high reputation as a portraitist—perhaps the highest in Berlin. His work, whether it is a soft vignette, or a deep and vigorously-printed study, betokens the care and assiduity of a man who loves his calling, and strives his every nerve for success. Like Luckardt, Herr Schaarwächter poses every model himself, and employs plate after plate on a difficult subject until the sun declines, and the model grows weary. The photographer himself, however, seems never to tire; the interest he takes in his work keeps up his unflagging spirit. Herr Schaarwächter's hour for ending his labours in the glass-room is two o'clock; but it was five ere he regretfully gave back his sitter—a tiny, blonde-haired English Miss, of four or five—into the charge of her parents.

Before we leave the office, there is one practical feature about it that may be recorded, since it demonstrates what may be done in a small space towards the exhibition of pictures. There is against one of the walls a cabinet, on the inside of which are attached photographs of various kinds. The inside wall, you see, is not, however, the actual back of the cabinet, for you may seize and open it (it is on hinges), and behind is displayed another show of pictures. This second back opens in like manner, and displays a third and fourth, so that the cabinet holds a large collection which, while readily displayed, are within a very small compass. But the best of the arrangement is its exceeding simplicity. The false backs, or walls, that open one after another, are all on the same hinge, or, rather, turn on the same pivot. As shown in our sketch, it is only necessary to lengthen the arm of every successive hinge, in order to make one back fold over the other. Thus the outer back or flap of the cabinet, which folds over all the rest, is made fast to hinge *a*, while the next in order is fixed to *b*, until we come to the inside flap of

all, which is carried by hinge *e*. With this economical means of exhibiting pictures, the customer need go no further than the little counting-house to select the kind of portrait he desires.

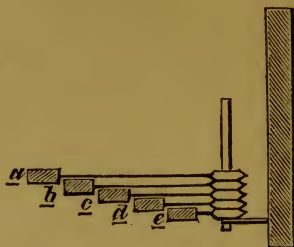


Fig. 1.

A handsome *salon*, the furniture covered with green velvet, serves as waiting-room; but there are few portraits to be seen here, as the visitor is supposed to have made his selection ere he penetrates thus far.

In the glass-room there are several points to note. In the first place, Herr Schaarwächter has no lines or cords for the moving of his blinds or curtains. These, of bluelinen, hang in very loose festoons from the roof. Brass wires run the whole length of the glass roof; they are parallel, and, perhaps, two feet apart. They are kept taut—this is very necessary—in the same way, pretty well, as our wire fencing; that is, each end of wire passes over a roller (*a*), and then round a wheel furnished with a cog

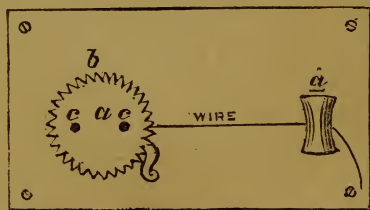


Fig. 2.

(*b*). On the face of the cog-wheel are two holes (*c*) into which a key or winch fits, for the purpose of keeping the wire taut. The arrangement can easily be understood from our cut (fig. 2).

It is necessary that brass wire be employed, and not iron, for

the latter rusts, and then loses its smoothness; and unless the wires are smooth, the curtain rings will not run upon them with ease and facility, for, as we have said, the curtains are quite loose and baggy. Here is a transverse section of the roof (fig. 3),

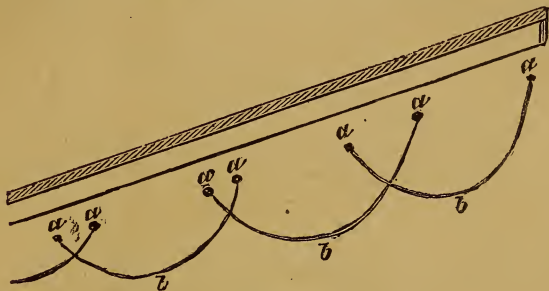


Fig. 3.

showing how the wires are fitted, and how the curtains are arranged. *a, a, a, a,* are sections of wires, and *b, b, b,* the curtains, which are so hung as to overlap one another. Herr Schaarwächter simply uses a light bamboo pole to manipulate his curtains. He pushes the curtains away at this part of the roof, or makes them cover that part. The rings on the stretched brass wire move with exceeding facility, and a more simple plan of manipulating curtains to effect light and shade cannot be conceived. "One of its advantages is that it never gets out of order," says Herr Schaarwächter, moving the blinds backwards and forwards with his pole, to show how easily they work.

The backgrounds, of which half-a-dozen hang one behind another, are drawn out for use with the same ease. The bottom of the background does not touch the floor, for the screen is suspended from above; the top is attached to two reels, which run upon a stout wire, and may thus be brought out at the back of the sitter, or pushed in again, with a motion of the hand (see fig. 4). A light and narrow skirting board is put down to cover the small space between floor and background, or, if it is an outdoor scene, the join is covered by a fringe of grass, or something of the sort, attached to a suitable foreground. The stretched backgrounds move out and in so easily, that it is no trouble at all to change them. Most of the backgrounds are Scavey's, but one of home manufacture, representing a piece of faded tapestry, is marvellously good. Its subject was not only in keeping with

many portraits we saw, but its faded, neutral aspect afforded a striking contrast to the vigour and modelling of the sitter. The studio is protected from direct sunlight on the outside by an upright canvas screen about ten feet high. "But I always remove it in the winter time," says Herr Schaarwächter.

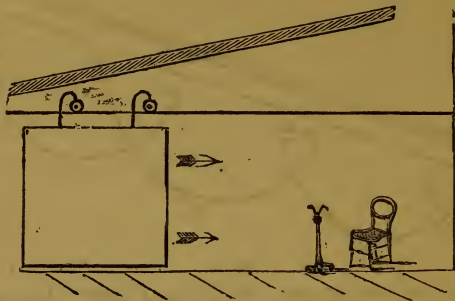


Fig. 4.

We walk into the laboratory. During the past winter Herr Schaarwächter employed nothing but gelatine plates with oxalate development; but for summer work he still prefers wet collodion, except for children. Here is an assistant washing plates and albumenizing them; each sheet of glass is held under the tap, rubbed rapidly with a rag, rinsed again, and then albumenized, the solution being poured first upon one angle of the plate and drained, and then applied a second time from the opposite angle. Two whites of eggs beaten up and mixed with 8 lb. of water, to which a few drops of ammonia are added, serves for the preliminary coating of the plates.

"But I do not give up gelatine plates altogether in summer," says Herr Schaarwächter, leading us into his enlarging-room. "All my diapositives are made with gelatino-bromide. A collodion positive is not only not so delicate, but it frequently exhibits a halo round the blacks, which gelatine never shows. Moreover, as enlargements all tend to hardness, while gelatine invariably tends to softness, the latter is a good counterpoise."

Herr Schaarwächter, however, although he produces small diapositives, does not make them in the ordinary way by placing negative and gelatine plate in contact in a printing-frame. He thinks you cannot control the exposure so well. He prefers

making his transparency with the gelatine plate in a camera in the same way as the enlargement is afterwards made, giving a tolerably long exposure, and having recourse to leisurely development. A more satisfactory transparency is thus secured, he contends, for enlarging purposes, where it is very important that the utmost uniformity should exist. Herr Schaarwächter employs an enlarging apartment very similar to that we have described at Messrs. Window and Grove, and elsewhere. He is wise enough also to use a horizontal bath, swinging on a pivot, for sensitizing plates, which permits of the draining of the plate so thoroughly; indeed, on the score of economy, little waste of solution, and cleanliness, this (so-called) Burton bath is exceedingly effective.

The printing-room is an apartment fitted on one side with glass, towards which the printing-frames are turned. The frames are in tiers upon tall sloping stands, that much resemble flower-stands. The glass is not shaded, but, in case the light is too strong, the stands are simply moved back—they are on a sort of tramway—two or three feet, according to the judgment of the printer. The printing is said to proceed more rapidly than when a screen of tissue paper or dull glass is employed.

Herr Schaarwächter packs every negative in paper, putting half a hundred together in one pigeon-hole. Each negative is simply numbered consecutively, and a ledger describes them. If a negative is too large for the pigeon-hole, the searcher for it finds a piece of cardboard in place of the plate, and this cardboard tells the locality of the particular cliché. "I shall never throw away any of my negatives. I was thinking only the other day of clearing out the bottom row of old clichés, when I received an order for forty thalers (£6) from two or three of the portraits. As that sum represents a hundredweight or so of glass, I can look upon this old part of my stock as paid for."

Herr Schaarwächter had but just returned from a holiday on the shores of the North Sea, and he was good enough to show us a practical little outfit, made by a well-known hand (Stege-mann, of Berlin), that had served him to bring back some reminiscences of his stay. To a spirit level upon his tourist camera he attached considerable importance, for he found it one of the readiest means of levelling his camera, a point of some importance with tourists, whose small pictures have sometimes to be trimmed rather considerably to make them square. A

changing-box by Stegemann, to hold a dozen plates, Herr Schaarwächter also pronounced to be very practical.

Just now Herr Schaarwächter is making a speciality of the Boudoir portrait; a single example of this is delivered to the customer for fifteen marks or fifteen shillings. If he desires more afterwards, he may have a dozen for eighty marks.

HERR TH. PRUMM, UNTER DEN LINDEN, BERLIN.

UNTER den Linden! We have a grievance, and we mean to set it down here. It concerns the Linden or Limetree Avenue that give their name to the most famous thoroughfare in Berlin—nay, in the whole Fatherland. Ten years ago we paced the flags of the capital under the same sense of injury, and to-day the trees appear even smaller and slighter than they did then. Only fancy a wizen plantation of pigmy trees with stems that you might clasp almost with your hands, and not an offshoot that is worthy of the name branch, after you have been dreaming of a mighty avenue with shadowy over-spreading foliage, lofty tops reaching to the sky, and massive translucent greenery redolent with the sweet perfume of the lime blossom! All this and more does the name “Unter den Linden” call up in the traveller’s mind; he fancies himself walking under shadow of big green boughs where the glaring sun and blinding white dust cannot reach him, where comfortable seats offer cool repose, and where he may find a soothing retreat after the busy turbulent streets of the metropolis. Visions of lofty limes he has seen elsewhere haunt his memory, and he hopes for something that shall combine the sylvan attractions of Hyde Park with the brightness and sparkle of the Boulevard des Italiens. Alas! when he looks upon the reality, he finds that the only thing romantic about Unter den Linden is its name, and that the green glades and arcadian paradise exist only in his imagination.

We must, however, be fair in our criticism. Having now aired our grievance, it behoves us to admit that it is the name, and the name only, that causes disappointment. Unter den Linden, from the famous Brandenburger Thor to the Palace of the Emperor, is a magnificent thoroughfare, and well worthy of its capital. There are fine public buildings and bright shops

throughout its entire length, and as a fashionable promenade it takes rank with the chosen spots of Paris and London which we have just named. In one of the best positions in Unter den Linden we find Herr Prümm's studio, and as it is one of the two leading establishments we have selected to visit, in order to give our readers an insight into the studios of Berlin, we make our call, and are fortunate enough to find the principal "at home."

In Berlin, the high class studios differ slightly from those elsewhere. There is no reception room, in the way in which we usually understand the word. There is rather a counting-house, fitted with elegance and taste, and one or more waiting rooms, also well-appointed, but not making the same display of specimens as is usual with us. The difference is very slight, but still there is the difference; the customer usually comes to some understanding in the ante-room, or comptoir, as to the nature of his wants before entering the waiting room.

Below, and also on entering the studio, a printed notice informs visitors that the studio is open from nine to six, and from nine to two for taking of portraits. The same arrangement—not to take portraits after two—we noticed in other establishments; and although the photographer has at times to go beyond the rule, the regulation is a very good one for two reasons; in the first place, work is not carried on after the best of the light has gone; and secondly, the photographer is released after a sufficient spell of labour. The public, too, are taught to come betimes, and thus a good deal of hurry and haste is avoided.

To Herr Prümm we have much to be thankful for. It seems to strike very few that journalists are sometimes busy men, and that their time is valuable. In our own case, and especially when we have travelled some hundreds of miles to pay a visit "at home," there is often but a certain narrow and fixed limit of time in which to make a call; and yet our friends apparently conceive a notion, at times, that we are going to settle down among them, and that whether we delay our visit till next day or the day after, is immaterial. Herr Prümm was very good in this respect. He bade us welcome at once; he was actually guilty of keeping a sitter waiting some minutes in order that his reception might not seem to lack warmth, and for this attention, as well as for his generous hospitality, we cannot enough thank him. Our only hope is that in comparing notes in the theory and practice of photography he may have benefitted in some slight degree by

our conversation, as we believe our readers will benefit by our brief description of his compact and elegant little studio.

Herr Prümm's bargain with the public is, that they pay half the amount only of the order at the time it is booked, and this condition is posted up in plain characters in the studio. It is the best arrangement that could well be devised. No doubt to pay the whole amount is wise under some circumstances, but it not unfrequently happens that the sitter would give a bigger order if it were not for the fact that he hesitates to disburse a large amount at the outset. Moreover, the *half* is a fairer transaction towards the public. In any case, Herr Prümm has found out the advantage of such payments, and he proposes to keep to it. His customers are numerous, and of the highest class, and there is, perhaps, no photographer who is so successful in producing vignetted baby portraits as our kindly host in Berlin. The poses of the little sitters are quite humorous from their sprightly and natural character, while the soft style of the negative and of the print are thoroughly in keeping with the subject.

While speaking of the sketchy harmonious character of Herr Prümm's vignettes, we may mention how they are printed. "You will see how fast it goes, if you will come out upon the roof," says Herr Prümm," and we follow him. The printing is not done under glass, but the frames are simply laid upon upright stands, which are not placed in the shadow, but merely turned away from the sunlight. There is not that loss of power which is sometimes very great under a roof or in a sheltered recess, and the consequence is that a dozen prints may be produced on a bright day. Most of the delicate vignettes have a piece of fine tissue paper laid over the frame, and during the printing the frame is occasionally reversed, but otherwise no particular care is taken. "I have tried many ways of printing, but have always come back to this simple plan. Once, at the suggestion of a friend, I had a series of planks nailed to the printing stand, so as to form recesses for the frames, and only allow parallel rays to strike them; but the result was to produce very hard negatives," says our host. In Herr Prümm's establishment—as, in fact, throughout Germany—lavish use is made of carmine, with which to cover the weak parts of a negative; the red solution is simply applied in patches on the back of the negative, and thus modifies the action of the light.

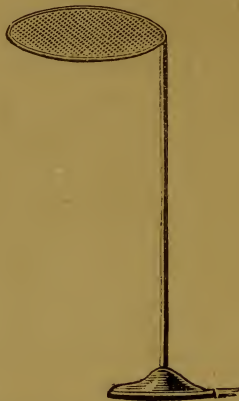
There is not a single painted background in Herr Prümm's studio. Indeed, there was only one practical background of any sort that we saw, this being apparently a solid screen on castors, one side of grey cloth stretched flat, and the other side shaped convex, or alcove form, which would naturally give a darker ground. We say the screen was solid, because it seemed so; but when we touched it, it was so light and mobile, as to be easily moved with one hand. But in his pictures, Herr Prümm usually employs the end studio wall as background; he uses, in a word, a real wall, properly decorated, of course, together with ordinary chairs, tables, and other furniture. In effect, Herr Prümm neither makes use of background nor accessories in the ordinary acceptation of the term, but photographs his sitter as if the latter were in an ordinary room among ordinary furniture.

The curtaining of the studio requires no remark, nor the mode of lighting. On the walls are some attractive pictures, one of them a humorous sketch by Hans Hartmann—of the well-known firm of Loescher and Petsch—who has done his best to put sitters in a good temper by depicting an improvised studio in the backwoods among the Indians. Where tatooing is the custom and scalping of every-day occurrence, one naturally expects apparatus to be a little rough, and we are not surprised, therefore, to see an ochred visaged model, standing against a tree, whose head is kept firm to the stem by the aid of a long corkscrew, which, after piercing the wood, is made to enter the Chickachaw's cranium. With such an awful example before them, sitters in Herr Prümm's studio are not likely to cry out against the European head-rest, which, by good fortune, has fallen to their lot, instead of the primitive apparatus of the prairies.

A simple head-screen deserves mention. It is merely (see fig., p. 236) a round diaphragm, about two feet in diameter, of violet gauze, which casts a shadow about the head of the sitter without cutting off much light. The screen does not darken the tint of the hair, while it casts sufficient shade over the parting or premature baldness to prevent these being exaggerated in the photograph. The screen stands scarcely six feet high.

"This series of prints on the wall are all taken on gelatine plates," says Herr Prümm, pointing to a fine collection of brilliant cabinet pictures. We ask our host if he still uses

emulsion. "I employed nothing else for five months during the last autumn and winter, and would have been glad enough to continue. But there were two reasons against it; in the first place, I could not get uniform films, not so much as regards



sensitiveness, as in respect to thickness. I was plagued with a lot of thin films, and in these I found the bromide was generally thrown down in tiny black spots, as when an old silver bath is used in the wet process. In the second place, I find my wet plates work fast enough in summer, and I have no occasion for more rapid exposures." Herr Prümm employed oxalate development throughout, and was good enough to show us some plates taken on a summer tour in Switzerland and on the Stelvio Pass, whence he has just returned.

To the matter of washing, Herr Prümm devotes considerable care. He makes it an invariable rule that each print shall be taken up separately by the assistant and washed by hand in eight changes of water, after which the picture is thrown with others in running water for the night. In the morning the prints are again separated, and rinsed one by one by hand. "Those prints of mine in the show-case have now been there two or three years exposed to all sorts of weather; they have never once been tampered with, and yet there is not a trace of yellowness to be found."

At Herr Prümm's establishment the charge for a dozen cartes is fifteen marks or shillings, while half-a-dozen cabinets are charged the same, and these prices may be regarded as those of all first-class studios in Berlin.

STUDIOS IN AUSTRIA.

FRITZ LUCKARDT AT THE HOTEL NATIONAL IN VIENNA.

“UNDER no circumstances whatever can portraits of little children be taken !” So reads a significant notice in the reception-room, which makes many a visitor stare ; it is one of the first subjects, too, on which we speak, when Herr Luckardt kindly bids us welcome. “ You see, I am not a baby’s photographer,” says our smiling host. “ It requires a good deal of natural tact to deal with children, and I frankly confess I have not the proper attributes. The children’s photographer must possess an even temperament and a contented mind ; nor must he be put out if the child gets eight toes to its feet instead of five.”

If we were asked with whom of all our English photographers we should compare Herr Fritz Luckardt, our answer at once would be, Mr. H. P. Robinson, of Tunbridge Wells. There is a spirit of independence, and a straightforward way of speaking and acting, very characteristic in both gentlemen. We spoke of Herr Luckardt to several friends in Vienna and Berlin, and the comment invariably was, “ Ah ! when I have such a good name, and so firmly established a reputation, as Herr Fritz Luckardt, then will I, too, be independent.” But there is something more than independence that makes up our friend’s character ; it is the independence of a thorough artist, the strong will of a man who knows that he is right, the firm assertion of a master who is confident of his power. At the same time, there never was one more cognisant of his weakness, and the shortcomings of his art. He knows when success will reward him, and when his labours, try as he will, must necessarily fail. The perfect rendering of drapery in Fritz Luckardt’s studio is proverbial ; the delicate folds of robe or mantle, right to the very margin of the plate, the exquisite shades that play upon the fabric, the fineness of detail, while yet softness and harmony prevail, are all subjects for wonder ; and yet Herr Luckardt never dictates as to the tint or style of his sitters’ dresses. “ I take my sitters as they come. If they consult me as to dress, I tell them to wear what they like best.”

With all our host's success in portraiture, he is not always contented. "Sometimes a lady appears in the studio, and, before I have well time to say good morning, she begins with, "Oh! Herr Luckardt, I have been taken by Schulze, and Schmidt, and Müller several times; and now I come to you to give me a proper picture." Well, if I am in a good humour, I say, "I will do what I can, madam, of course; but it seems to me, if all these gentlemen have tried their best and failed, that the fault is not theirs, but your own."

Herr Luckardt's studio is a low-roofed one. It strikes the visitor at once as a broad and shallow apartment. On the light side there is a three-foot skirting-board; then, perhaps, seven feet of glass. The glass roof slopes but slightly, and, as its width is probably eighteen feet, the glass room naturally strikes one as being very low indeed. The entire length of the studio is about twenty-seven feet, of which seventeen is glass. This glass portion of the roof is surmounted along the edge (outside the studio, of course) by an upright metal screen, six feet high, which serves the excellent purpose of keeping the direct rays of the sun from entering through the roof (fig. 1).

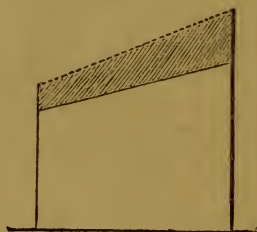


Fig. 1.

This sun-screen permits the photographer to work with but few curtains, and to employ top-light without fear of the sun. Indeed, in Herr Luckardt's studio, most of the work is done by light that comes through the roof. There are curtains everywhere; but use is rarely made of them, the metal shield answers its purpose so well. "Employ as few screens as possible," says our host; and there is no need for them, since the light is not direct. So little account does Herr Luckardt take of his side-light, that the panes are, many of them, covered with dark

calico, while others are screened with transparent tracing-cloth. The tracing-cloth is below, and the more opaque calico above, so that a low shadow may be cast if necessary.

"I put my model here," says Herr Luckardt, placing a chair not more than six feet from the light side of the studio. "Then, as a rule, I move my camera a little to this side or that, until the lighting and pose appear most favourable. It is so much easier to move the camera than the sitter." To secure light or shadow about the dress of the model, a movable screen but five feet high is employed, fitted with both light and dark fabric, like dark and light blinds that are made to pull up and down. You may pull the dark blind down over the light one, and so have a dark screen; or you may have only a light one to reflect the lower part of the dress; or, again, you may have the screen parti-coloured—the lower part light and the higher part dark, or *vice versa*. A method of constructing such a screen will suggest itself to most people, and its value is evidenced by the exquisite lights and shadows to be seen in the drapery of Fritz Luckardt's models.

The shadow side of the studio is too far away from camera and sitter to exert any great influence, and is covered with paintings and works of art likely to interest the sitter. Herr Luckardt has also a good method of attracting the sitter's attention during exposure, consisting of a little clock-work apparatus, with a carte-de-visite opening. The sitter looks at the opening, and is interested to see portrait after portrait come into view ("they are all of Vienna celebrities," says Herr Luckardt); in this way an animated expression is secured, without any strain upon the sitter. There is so much light in his low-roofed studio, and so little of it is cut off by curtains (thanks to the sun-screen outside), that exposures are comparatively quick, and Herr Luckardt has found no use for gelatine plates. "I always take plenty of time over each sitter, you know; although one of these days my mode of working may alter," observes our host, laughing, "and I shall have to take portraits at express speed; gelatine plates will then be very handy. My assistant will cry out sharply over the bannister, 'No. 45 now sitting; please send up Nos. 46 and 47.'"

Herr Luckardt not only poses and arranges every sitter, but does much of the technical work besides. More than this; what he himself cannot do, he does not leave in unskilled hands. His

chief assistant is, perhaps, only second to himself in ability and artistic capacity, and it says something for Herr Luckardt, as a principal, that his first lieutenant has remained with him for many years. Talented assistants are not so rife that one can afford to part with them, and Herr Luckardt is evidently wise enough to know when he is well served. Only silver printing is resorted to in the Luckardt establishment; indeed, carbon printing, if not unknown, seems to have scarcely a disciple in Vienna.

Herr Luckardt is very complimentary towards English sitters. They are of a quieter disposition, he says, and are more obedient and plastic. "Unfortunately, in your English faces, the front teeth are apt to be prominent, and one has sometimes to choose between an animated face, with the mouth open, and a glum expression, in which the teeth are not shown. Directly I ask my English sitter to close his lips, his brightness vanishes." Many of our readers will be able to bear out what Herr Luckardt says, but it is only, of course, when the British face is contrasted with those of other nationalities that the character is most apparent.

Herr Luckardt has something to say about the glazing of studios, and hopes that a plan he has advocated for some time past may ere long be universally adopted. The inconvenience of a leaky glass roof is too well known to require that any stress be laid upon it, and it is Herr Luckardt's opinion that if glass plates were only made of rhomboid form, and so laid one over another towards the top of the roof, there would be no longer any complaint of leakage from rain. But it is not only necessary that the glass panes for the roof, fig. 1, should be rhomboid in



Fig. 2.

shape—that is to say, not rectangular—but it is also requisite that they be placed *not horizontally*. Therefore, it is necessary

that the iron rods upon which they are made fast should be cast or rolled in such a way that the pane of glass rests a little higher on one side than the other; the drops of moisture or rain will then, as they collect, run down from one edge to the other. At present, the usual plan is to place the panes of glass (*c*) as in fig. 3, in a horizontal position, and the iron rods (*a a*) also on a



Fig. 3.

level, while the fastenings (*b b*) are likewise the same one side as the other.

If, however, Herr Luckardt says, the arrangement was that shown in fig. 4, then the rain drops would be carried off from



Fig. 4.

one pane to the other by the point *d*. The rain as it collected would pour from *d* into the channel *r*, which might easily be cast upon the iron rods at the time these are made.

The varnish Herr Luckardt employs for retouching is a little different to that generally employed, and is compounded of the following ingredients, viz.—

Alcohol ...	...	...	...	...	300 parts
Sandarac	...	...	...	...	50 „
Camphor	...	...	...	...	5 „
Castor oil	...	...	...	...	10 „
Venetian turpentine	...	...	...	...	5 „

DR. J. M. EDER AT THE IMPERIAL TECHNICAL ACADEMY IN VIENNA.

A MASSIVE, square-built pile is the Technical Academy. It is a stone building, erected at the beginning of the present century, and situated in the city itself. There is a statue of Ressel in front, the discoverer of the screw steam-ship, according to Austrian authorities; but there is no pretension to ornament outside or in. The only sense, as you enter, is that of bewilderment, standing in the wide vestibule, and gazing at the multitude of doors that lead to innumerable class-rooms. Nobody heeds you; all who like, apparently, are welcome to come in, and, so we afterwards learn, there is actually no fee demanded from those who desire to attend Dr. Eder's lectures on photographic chemistry. We enlist the services of a guide, and pass from one cold passage to another; presently the pungent odour of chemicals is wafted on the air, and in another moment we enter Dr. Eder's laboratory.

We take his portrait as best we can without camera and gelatine plates. A tall, sprightly figure, sparely built; he wears a slight beard and moustache, quite black, and has dark piercing eyes, that glitter the more, possibly, because of his spectacles. Still young, he has the exuberance of a boy, and the *élan* of a Parisian student. His exhaustive researches, instead of telling on his nature, appear only to have increased his thirst for investigation, and before a quarter-of-an-hour has elapsed, we have rapidly reviewed the most prominent problems of the day, not forgetting the gelatino-chloride process, which has of late taken up so much of his time, and that of his brother-in-law, Captain Pizzighelli.

We ask about his present work; if he is busy just now? Our friend shrugs his shoulders, and glances round the laboratory. Then he looks at us with his arms akimbo, and laughs. There are some half-a-dozen experiments going on in the laboratory at this moment, touching oxalate development, consistency of gelatine, and the treatment of gelatino-chloride.

"These experiments here," says Dr. Eder, "have reference to the double salt formed by iodide of mercury and hyposulphite of soda, as it occurs in Edwards' intensifier. It is a *new* double salt, and I want to find out something about it. The Edwards'

intensifier is decidedly sensitive to light; in the dark, after a few days, a *yellow* precipitate falls, which, for the most part, consists of sub-iodide of mercury; while in daylight a *dark* precipitate forms, and there is a larger quantity of it. I want to get at the true cause of this," says our energetic chemist.

Dr. Eder moves on to another part of the laboratory. "I am doing something here, as you may see, with iron salts. By the decomposition of ferricyanide of potassium in light (red prussiate of potash), ferro-cyanide is, of course, formed; but, at the same time, another *blue* product results, which has never yet been properly investigated. So I am going to try what I can do in the matter."

There are other investigations to which the versatile chemist briefly refers, touching the behaviour of aqueous solutions of chlorine, bromine, and iodine in light in the presence of organic bodies. "These experiments, I am glad to say, I am just finishing," adds the doctor blithely.

Returning to the Technical Academy itself, we ask Dr. Eder for information about his lectures. These, it appears, are held during the winter half-year only, and they take place in the evening from five to six, so that photographers, their assistants, and, indeed, any one who has occupation during the day, can attend. Every Thursday and Friday, at this hour, some thirty students attend in the class-room, where Dr. Eder holds forth, there being, as we have said, no fee to pay so long as certain conditions are complied with.

The audience is a singular one, says the doctor. Some of them are university students, who attend the course of lectures as a branch of chemistry and physics, and on whose account it is necessary to go systematically into photography in all its scientific bearings; another portion are, on the other hand, practical men and working photographers, who come for technical knowledge, and live in hopes of hearing of some universal formula by which, notwithstanding clumsy development and blundering manipulation, they may still be able to produce beautiful pictures; finally, there are young assistants, whose principals take care that they shall be well grounded in the theory of their work.

Under these circumstances, Dr. Eder has rather a difficult task to perform. He must, perforce, touch upon purely chemical points, as well as those of a thoroughly practical character;

otherwise, he naturally enough loses a portion of his audience.

"To do this," continues the doctor, in quick, earnest chat, "I change my plan of lecturing year and year about. One season I begin with photo-chemistry (that is to say, I treat of oxidation in light, of chlorine and hydrogen, &c.), and then discuss the silver salts and optics at the end of my course; the next year I begin my lectures by treating of optics, and then take the salts of silver, &c. But I always lay great stress upon iron, uranium, chlorine, &c., because I find I can teach the essence of photo-chemistry much better through them than through the silver salts." In a word, Dr. Eder considers that the reactions of the above-named elements are more easy of comprehension by the students, and when the lecturer has instilled a knowledge of their behaviour, the rather complicated changes that silver salts undergo when acted upon by light, and by developing and fixing solutions, are more readily grasped.

Here are the gelatino-chloride transparencies which were exhibited by Dr. Eder and Captain Pizzighelli. They are a magnificent series. All are portraits, and nearly all from one and the same negative—a charming bust picture of a Viennese beauty. They appear more brilliant than carbon transparencies, and, by reason of their varied tone, they are to be preferred to ordinary silver impressions with collodion or albumen. Of the thirty or more in the series, no two are alike. The darker tones, the doctor tells us, are all produced with ammonio-chloride of silver and citrate of iron, or citrate of iron and gallic acid. These are decidedly the most elegant transparencies, especially when toned with gold, to wit: a bath of chloride of gold, hyposulphite, and sulpho-cyanide of ammonium. The yellow-brown tones and crimson tints, some of which are delightful in their warm glow, are produced with silver chloride alone, or with hydrochinone. By ringing the changes on the developers, the most delightful shades are apparently to be secured, and the series show that Dr. Eder and his clever coadjutor have taken gelatino-chloride out of the domain of experiment, and made a practical process of it.

It may be supposed that, with these investigations on hand, the worthy doctor's time is fully occupied. Not so, however. When test-tube and beaker are out of his hands, he must needs drive a quill, and to some purpose, too. No sooner had he finished "Modern Dry Plates," than he began a work of

much larger dimensions. His object is to write a complete manual of photography—a work that will fill, according to his present calculation, some 500 to 600 pages. He proposes to make it a history of the art, and to include both the high-ways and bye-ways of photography; that is to say, treat of experiments and processes which so far may have led to no practical results, but of which a record is almost as desirable as the every-day methods in general use. Dr. Eder, in a word, designs to write a book like Hunt's—a comprehensive treatise on photography, which shall be a history as well as a book for the student. Of this work, the two first parts have now been published by Knapp, of Halle, Germany.

MESSRS. WINTER BROTHERS IN VIENNA.

ENLARGEMENTS UPON CANVAS.

WE had seen so much second-class work in the nature of photographic enlargements upon canvas, that we did not feel at all enthusiastic when our friend Dr. Eder proposed a visit to Messrs. Winter's establishment. We suppose something of the sort must have appeared in our face, for he added, "Well, do me the pleasure to come, at any rate; if you are not delighted, you shall denounce me as I deserve." We went, and we were delighted.

Their working establishment was in full swing at the time of our visit, and Messrs. Winter unreservedly conducted us through every portion of it. On the upper floors, in half a dozen different rooms, were artists engaged upon painting the canvases; upon their skill it is not necessary here to dwell, for in Messrs. Winter's establishment, as everywhere else, you can engage good artists if you will only pay them. Our business is strictly with the photographic portion of the work, and to a description of this we shall confine ourselves.

Imprimis, however, we must describe what it is Messrs. Winter set themselves to do. It is this. They say to photographers in general: If you will send us a portrait, either negative or positive, we will produce you an enlargement on canvas worked up in monochrome. The success of their undertaking lies in the circumstance that they do not produce coloured work—or, at any rate, it is exceptional on their part to do so—but

devote their efforts to the production of an artistic portrait in brown or sepia. In this way they can make full use of the dark brown photograph itself; there is less necessity for tampering with the enlarged image, and natural blemishes in the model itself may be softened and modified, without interfering much with the true lines of face and features. The monotone enlargements of Messrs. Winter, again, exquisitely as most of them are finished, do not appear to provoke the opposition of the painter; they do not cross his path, and hence he is more willing to do them justice. Many a would-be purchaser has been frightened out of his intention to buy an enlargement by the scornful utterance of an artist friend about "painted photographs," and in these days of cheap club portraits there is certainly much risk of good work falling into disrepute. But a well-finished portrait in monotone disarms the painter, and he is willing to concede that the picture has merit.

"We cannot use English canvas, or 'shirting,' as you call it," said one of our hosts; "it seems to contain so much fatty matter." The German material, on the other hand, would appear to be fit for photography as soon as it has been thoroughly worked in hot water and rinsed. Here, in this apartment paved with red brick, we see several pieces of canvas drying. It is a large room, very clean, here and there a washing trough, and in one corner two or three large horizontal baths. The appearance is that of a wash-house, except that all the assistants are men, and not washerwomen; there is plenty of water everywhere, and the floor is well drained to allow of its running off. We are to be favoured with a sight of the whole process, and this is the first operation.

Into one of the horizontal baths, measuring about 5 by 4 feet, is put the salting solution. It is a bath that can be rocked, or inclined in any direction, for its centre rests upon a ball-and-socket joint. It is of *papier mache*, the inside covered with white enamel. Formerly, only bromine salts were employed, but now the following formula is adopted:

Bromide of potassium ...	...	...	3 parts
Iodide of potassium ...	...	...	1 part
Bromide of cadmium ...	...	...	1 part
Water ...	...	...	240 parts

Four assistants are required in the operation, and the same

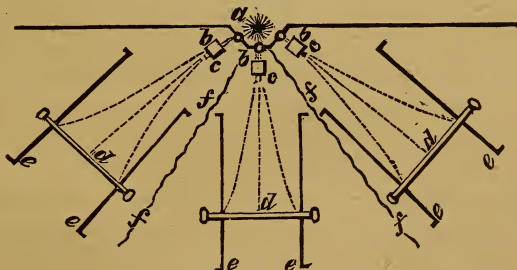
number when it comes to sensitizing and developing, all of which processes are commenced in the same way. The bath is tilted so that the liquid collects at one end, and near this end two assistants hold across the bath a stout glass rod; then the canvas is dipped into the liquid, and drawn out by two other assistants over the glass rod. In this way the canvas is thoroughly saturated, and, at the same time, drained of superfluous liquid.

The canvas is hung up to dry; but as some time must elapse before this particular piece will be ready for sensitizing, we proceed with another canvas which is fit and proper for that process. The room, we should have mentioned, is provided with windows of yellow glass; but as there is plenty of light nevertheless, the fact hardly strikes one on entering. The sensitizing, with a solution of nitrate of silver, is conducted with a glass rod in the same way as before, the solution being thus compounded:

Nitrate of silver	...	...	...	4 parts
Citric acid	...	...	...	1 part
Water	...	...	...	140 parts

Again the canvas is dried, and then comes its exposure.

This is done in a room adjoining. We lift a curtain and enter a space that reminds one of the underground regions of a theatre. There are curtained partitions and wooden structures on every hand, dark murky corners combined with brilliant illumination. Messrs. Winter use the electric light for enlarging, a lamp of



a, electric light; *b*, condensers; *c*, cameras; *d*, canvas on screen; *e*, tramways; *f*, curtained partitions.

Siemens driven by a six-horse power engine. The lamp is outside the enlarging room, and three large lenses, or condensers, on three sides of the light, permit the making of three enlarge-

ments at one end at the same time. Our rough sketch gives an idea of the disposition of affairs (see fig., p. 247).

The condenser collects the rays, and these shine into a camera arrangement in which the small negative is contained. The enlarged image is then projected, magic lantern fashion, upon the screen, to which is fastened the sensitized canvas. The screen in question is upon a tramway—there are three tramways and three screens in all, as shown in our sketch—and for this reason it is easy to advance and retire the canvas for the purpose of properly focussing it.

Even with the electric light now employed, it is necessary to expose a considerable time to secure a vigorous impression. From ten minutes to half an hour is the usual period, determined by the assistant, whose experienced eye is the only guide. We should estimate the distance of the cameras from the enlarging apparatus to be about fourteen or fifteen feet in the instance we saw, and when the canvas was taken down, a distinct outline of the image was visible on its surface.

By the way, we ought to mention that the canvas is in a decidedly limp state during these operations. It has just sufficient stiffness to keep smooth on the screen, and that is all; the treatment it has received appears to have imparted no increase of substance to it. Again is it brought into the red-brick washing apartment, and again treated in one of the white enamelled baths as before. This time it is the developer that is contained in the bath, and the small limp table-cloth—for that is what it looks like—after being drawn over the glass rod, is put back into the bath, and the developing solution rocked to and fro over it. The whiteness of the bath lining assists one in forming a judgment of the image as it now gradually develops and grows stronger. Here is the formula of the developer:—

Pyrogallie acid	...	...	...	10 parts
Citric acid	...	...	...	45 „
Water	...	...	...	410 „

The developer—which, it will be noted, is very acid—is warmed before it is used, say to a temperature of 30° to 40° C.; nevertheless, the development does not proceed very quickly. As we watched, exactly eight minutes elapsed before Mr. Winter cried out sharply, “That will do.” Immediately one of the assistants seizes the wet canvas, crumples it up without mor e

ado, as if it were dirty linen, and takes it off to a wooden washing trough, where it is kneaded and washed in true washer-woman fashion. Water in plenty is sluiced over it, and after more vigorous manipulation still, it is passed from trough to trough until deemed sufficiently free from soluble salts to tone.

The toning—done in the ordinary way with gold—removes any unpleasant redness the picture possesses, and then follows the fixing operation in hyposulphite. As canvas is more permeable than paper, these two last processes are quickly got through.

The final washing of the canvas is very thorough. Again it is treated with all the vigour with which a good laundry-maid attacks dirty linen, the canvas, in the end, being consigned to a regular washing-machine, in which it is systematically worked for some time.

When the canvas picture at last is finished, it presents a very rough appearance, by reason of the tiny fibres that stand erect all over the surface. To lay these, and also to improve the surface generally, the canvas is waxed; the fabric is stretched, and a semi-fluid mass rubbed into it, heat being used in the process, which not only gives brilliancy, but seems also to impart transparency to the shadows of the picture. The result is a pleasant finish, without vulgar glare or glaze, the high-lights remaining beautifully pure and white.

Of course, the price of these canvas enlargements varies with the amount of artistic work subsequently put upon them; but the usual charge made by Messrs. Winter for a well-finished life-size portrait, three-quarter length, is sixty florins, or about £5 sterling as the exchange now stands. Besides working for photographers, Messrs. Winter are reproducing a large number of classic paintings and cartoons by photography on canvas in this way (some of them almost absolutely untouched), and these, as may be supposed, are finding a very large sale among dealers. Such copies must necessarily be of considerable value to artists and collectors, and altogether it would seem that Messrs. Winter have hit upon a novel undertaking, which bids fair to make them a handsome return for the outlay (large as it undoubtedly has been) made upon their Vienna establishment.

THE ATELIER ADELE IN VIENNA.

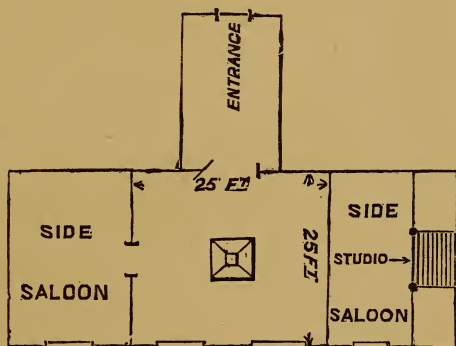
As in London, so in Vienna, it is difficult to say which studio is the very first. Nevertheless, we may say this of the Atelier Adèle, it is second to none in the Kaiserstadt; whilst we may also remark that in some respects it is the finest studio we have ever visited. In the first place, its glass-rooms—there are two of them—are not photographic studios at all in the ordinary sense, but brightly fitted *salons*. They are light, lofty apartments with elegant panels of white and dark wood, fitted with ornamental mirrors here and there, with a flooring of polished pine, and ornamental windows. The roof is of fluted glass, what glass there is, while the side light comes through matt glass windows, which have fancy panels figured over them. Everything appears as clean, bright, and new, as a modern dining-room or library, except that the woodwork is rather light, and there is an abundance of illumination.

There is little of photography in these elegant glass-rooms. A single camera is seen, and not even one example of a fancy background. Two or three plain backgrounds are all that meet the eye, with here and there a banner screen, made use of occasionally instead of the blue blinds, with which the glass may at any time be covered. One screen is exceedingly elegant. It is simply a light wooden frame, about five feet high, over which is negligently thrown two pieces of gossamer satin, one blue, the other white. Either one reflecting surface or the other is employed near the sitter as may be necessary, the delicate sheen of the glossy surface, either white or pale blue, yielding a very soft reflection; while to the eye, the pretty screen, with its shining fabric unstretched, is particularly pleasing.

Photographers who have not got on very well with gelatine plates, and still practise the wet process, may take consolation in the fact that the gelatino-bromide method is as yet unknown in the Atelier Adèle. "I have tried dry plates in my branch establishment on the Prater," says Herr Perlmutter, to whom, by the way, this beautiful studio belongs, "but only for equestrian portraits. But as I find I can get a very good wet collodion picture in the open air with a second's exposure, I do not find any necessity for adopting gelatine even there. I will not throw over collodion," continues Herr Perlmutter emphatically,

"until I see that vastly superior results can be obtained with something else; and, in my opinion, gelatine negatives are not superior." It is only fair to say that the Vienna light is a very good light; the exposure for a cabinet picture is never more than seventeen or eighteen seconds, and frequently requires only twelve, while carte negatives are taken practically instantaneously.

The entrance to the Adèle studio is very imposing. Viennese



photographers have a way of locating themselves on the top floor of an hotel—Luckardt, it may be remembered, is to be found at the top of the Hotel National—and a stranger feels rather diffident at first about penetrating the depths, or rather heights, of a hostelry in order to pay a visit to the studio above. When, however, the summit of the Hotel Müller is reached, you are adequately repaid for your trouble. Like the fine reception room of MM. Benque et Cie., in Paris, the Atelier Adèle is very dark. There are no windows in the broad corridor by which you enter, and you begin to think that they must have closed the shutters by mistake. The corridor leads into a central *salon*, still rather gloomy, for the two windows are draped with heavy curtains, and the furniture and floor are sombre to a degree. Everything is dark. The paper in one room is dark crimson, and in the other dark blue; here, in this apartment, the furniture is ebony and gold, in that, dark oak and gold; either drab velvet or dark satin covers the chairs; the floor is of dark polished wood, covered with dusky Turkey rugs; the portraits that are on the

walls are deep and vigorous, and mounted in shining black frames, while even the books of specimens have dark binding.

In the centre of the main *salon* is a handsome vase with green foliage and fresh grasses, forming the middle of a luxurious settee. Altogether, the apartments are most richly furnished, and when once accustomed to the subdued light, you feel a repose and quiet in these cool drawing-rooms that is very enjoyable after the hot sunshine and dusty streets of Vienna. While waiting, the visitor may read some couplets over the doors, the gist of which is to warn him not to expect too much flattery from the camera. Here is one of them:—

Ein Schmeichler ist der Spiegel nicht
Er gibt dir immer dein wahr Gesicht.

The charge for cabinet portraits is fifteen florins per dozen, a florin being said to be equal to two shillings English, although it is not so much just now by threepence or fourpence. For boudoir portraits, a style as long as the well-known promenade or panel, but twice as broad, the cost is thirty-six florins a dozen.

Herr Perlmutter is occupying himself a good deal with equestrian portraits, as we have hinted; he finds that if it is difficult to secure a pleasing picture of man and horse, still, in the event of success, it is a success, indeed—both from an artistic and pecuniary point of view. In fact, Herr Perlmutter is thinking seriously of invading England, and coming to London to try his hand on this especial branch of photography, with which, our readers will remember, M. Disderi occupied himself at Brompton many years ago. If there is work among cavaliers at Vienna, there must be ten times as much in our West End. It is a difficult task making good equestrian portraits, Herr Perlmutter admits; but he does not think photographers have ever fairly tried to do the work. If they did, they could not fail to get plenty to do, for those who own valuable horses are generally more anxious to get pictures of their property than of themselves. The number of people who own valuable horses is very large, and they represent a large *clientèle* to be had for the asking. In any case, Herr Perlmutter's heart is in his work, and he frankly says that if he succeeds in producing a good equestrian picture, it gives him ten times more delight than any photograph secured in the studio.

For all that, Herr Perlmutter makes some charming studies in his atelier. Large direct portraits as big as those submitted

in the Crawshay Competition are to be seen in the waiting rooms, for he prefers securing pictures direct, rather than enlarging, if money is no object. He works mostly with Voigtländer lenses. "Have you no Ross or Dallmeyer on the premises?" we ask Herr Perlmutter shrugs his shoulders. "I should very much like to have an instrument of Mr. Dallmeyer, but I cannot purchase one. There are none to be had ready made. I must order one to be constructed, and if I did that, it might not be what I wanted when I got it."

Silver printing, and no other, is employed in the Atelier Adèle, and black mounts edged with gold are evidently much in favour. The albumenized paper here, as in most German studios, has a faint roseate hue, which, while pleasing in portraits of small size, is also chosen because of the idea that it may counteract any yellowness that may subsequently appear in the pictures. This, as it may be, rosy-tinted paper is a little out of place in a vigorous masculine portrait.

"Do you retouch much?" Again Herr Perlmutter shrugs his shoulders. "So far as ladies are concerned, we must retouch a great deal; otherwise our lady customers won't have the pictures—that's all." The matter is no longer in the hands of the photographer; retouching is absolute with the Viennese dames, and they require a great deal of it. "We generally use Faber's 2H," adds Herr Perlmutter.

We pass from the glass-room into the laboratory, where plates are being fixed and washed, the day's work collected on draining racks ready to be varnished. As a rule, they are treble-plates, but in summer time the thin end is sometimes not exposed, as the third image in those circumstances leaves much to be desired. They are all wet plates, as we have said, and their manipulation presents no feature of novelty.

HERR LOWY IN VIENNA.

THE LICHTDRUCK PROCESS IN DETAIL.

LICHTDRUCK is German by name and German by nature; that is to say, it is among German-speaking people that the process is carried out to perfection and upon a large scale. Munich counts three large Lichtdruck establishments at least—those of Herrn

Albert, Bruckmann, and Obernetter; Vienna has certainly as many; while in Berlin, Dresden, Frankfort, Mayence, Hamburg, and elsewhere, first-class Lichtdruck firms are to be found.

Herr Löwy's studio at Vienna is one of the most complete photographic establishments we have met with, since it combines the taking of high-class portrait negatives with silver and mechanical printing. We should much like to describe the portrait-taking branch of the establishment, as well as the more industrial; but, in the first place, we have not the space at our disposal; and secondly, by reason, as it was explained to us, of an "unruhiges Frauen-zimmer" in the glass-room, we could do no more than take a hasty glance at that part of the building. We must be content for the present to bear testimony to the charming bust portraits of Viennese ladies for which Herr Löwy has recently become well-nigh as famous as Luckardt, and pass on to the Lichtdruck rooms; for a full description of the process as it is practised at the present day cannot fail to be interesting to our readers.

In Herr Löwy's compact establishment there is a *personnel* of no less than forty, of which the greater number are employed upon Lichtdruck. There is both the Schnell-press (quick-press) and hand-press here, for Herr Löwy does work of all sorts, from the finest to the roughest. It is rather a warm atmosphere into which we are first introduced, an apartment not very roomy and not very light, and here we are initiated into the first stage of the process.

Here is a sheet of glass. It is very thick, apparently a quarter of an-inch, and it is to be made into a printing block. The glass has been cleaned, and is now ready to receive the preliminary coating. The solution must be used *fresh*, and is prepared of—

Soluble glass	...	...	...	...	3 parts
White of egg	...	...	...	...	7 "
Water	...	...	...	9 to 10	"

The soluble glass must be free from caustic potash. The mixture is filtered and made use of the same day, being applied to the glass as evenly as possible. The superfluous liquid is poured off, and the film dried either spontaneously, or by slightly warming. The film is generally dry in a few minutes, when it is rinsed with water, bearing an open, porous surface that is said to be slightly

opalescent. We are bound to say, however, that this opalescence is so slight as to be scarcely visible to our inexperienced eyes.

Many of these plates (the surface now perfectly dry) are here ready for further treatment; they stand upon a slate slab, which is warm, for underneath is a water-bath. Herr Furkl, the skilful manager of this department, is one of the most experienced of Lichtdruck photographers, and he sees at a glance the quality of a prepared plate without any practical testing. "Now, this is a good preliminary film," he says; it is a glass that is transparent, and yet slightly dull. The film is so thin, you can scarcely believe it is there.

We now come to the second stage of the process—the application of a film of bichromated gelatine to the plate. This is the formula generally used:—

Bichromate of potash	...	...	15 grammes
Gelatine	...	...	2½ ounces
Water	...	...	20 to 22 „

According to the weather, the amount of water is varied; but, in any case, the solution is a very fluid one. An ounce is about 35 grammes, as our readers know.

The bichromated gelatine is poured upon the plate (it makes a very thin film), and the glass then put into the drying-chamber. Much depends upon the drying. A water-bath with gas-burner is used for heating, and a slate slab, perfectly level, receives the glass plate. The drying-chamber is kept at an even temperature of 50° C. The object to be attained is a fine grain throughout the surface of the gelatine, and unless this grain is satisfactory, the finished printing-block never will be. If the gelatine film is too thick, then the grain will be coarse; or, again, if the temperature in drying be too high, there will be *no grain at all*. The drying is complete in two or three hours, and should not take longer.

The film is now ready for printing under a negative, and this is done in an ordinary printing-frame. The sensitive film being upon the surface of a thick glass plate, it is necessary that the cliché or negative employed should be upon patent plate, or not upon glass at all, so as to ensure perfect contact. Best of all is it to employ a stripped negative, in which case absolute contact is ensured in printing. It is only in these circumstances that the most perfect impression can be secured.

The exposure is very rapid. Any one accustomed to lithographic work will understand this. At any rate, every photographer knows that bichromated gelatine is much more sensitive than the chloride of silver he generally has to do with. There is no other way of measuring the exposure than by photometer or personal experience, and the latter, we are assured, is by far the best method.

The impression is taken from the pressure-frame, and put into cold water. Here it remains for half-an-hour or an hour, according to discretion. The purpose is, of course, to permit the soluble bichromate to wash out. It is when the print comes out of this bath that judgment is passed upon it. An experienced eye tells at once what it is fit for. If it is yellow, the yellowness must be of the slightest; indeed, Herr Furkl will not admit that a good plate is yellow at all. A yellow tint means that it will take up too much ink when the roller is passed over it.

The washed and dried plate should appear like a design of ground and polished glass. The ground-glass appearance is given by the grain. If there are pure lights (almost transparent) and opalescent shadows, the plate is a good one.

We have now a printing-block ready for the press. If it is to be printed by machinery (that is to say, in a *Schnell-press*), the surface is etched; if it is to be more carefully handled in a hand-press, etching is rarely resorted to, and it is moistened only with glycerine and water.

Here is a plate about to be etched. It is placed upon a leveling-stand, and the etching fluid poured upon it. The formula is—

Glycerine	...	...	...	...	150 parts
Ammonia	...	...	...	...	50 „
Nitrate of potash (saltpetre)	...	...	...	...	5 „
Water	...	...	...	...	25 „

Another equally good formula, which is recommended by Allgeyer, who managed Herr Albert's Lichtdruck printing for some years, is—

Glycerine	...	...	...	...	500 parts
Water	...	...	...	...	500 „
Chloride of sodium (common salt)	...	...	...	...	15 „

In lieu of common salt, 15 parts of hyposulphite of soda or other hygroscopic salt, such as chloride of calcium, may be employed.

The etching fluid is permitted to remain upon the image for half an hour. Herr Furkl invites us to touch the plate, and by gently moving the finger to and fro over the surface we distinctly feel the swelling or relief of the image. The plate is *not washed* afterwards, but the etching fluid simply poured off, so that the printing block remains impregnated with glycerine and water; at the most, a piece of bibulous paper is used to absorb any superfluous quantity of the etching fluid. After etching, the block goes straight to the printing press.

The inking up and printing are done very much as in lithography. If it requires a practised hand to produce a good lithographic print, it stands to reason that in dealing with a gelatine printing block, instead of a stone, skill and practice are more necessary still. Therefore, at this point the photographer should hand over the work to the lithographer, or rather the Lichtdruck-printer. It is only by coaxing judiciously with roller and sponge that a good printing block can be obtained, and no amount of teaching theoretically can beget a good printer. To appreciate how skilful a printer must be, it is only necessary, indeed, to see the imperfect proofs that first result, and to watch how these are gradually improved by dint of rolling, rubbing, etching, cleaning, &c.

In all Lichtdruck establishments, two kinds of ink rollers are employed, viz., of leather and of glue. In some establishments, too, they employ two kinds of ink, but Herr Löwy manages to secure delicacy and vigour at the same time in an impression by employing one ink, but rolling up with two kinds of the roller.

Lichtdruck prints, and portraits particularly, are usually varnished; they are first coated with a dilute solution of gelatine to act as sizing, and then a spirit varnish employed. If the varnish were applied before the print is sized, the varnish would pass through the paper.

We describe the *Schnell-press* in action in our "At Home" with Herr Albert, and we propose to say something about hand-presses when we come to Herr Obernetter's well-known establishment at Munich.

HERR HOF-PHOTOGRAPH VICTOR ANGERER IN VIENNA.

VIENNA has long enjoyed a reputation for brightness and gaiety among European capitals. It now bids fair to lead the way by reason of the magnificence of its architecture, the grandeur of its public buildings, and the handsome character of its squares and public gardens. The Ringstrasse, as a thoroughfare, is likely to be unique; the broad belt of fortified wall and glacis which formerly surrounded the city has given place to a handsome and airy boulevard, with lofty buildings of white stone, green gardens, and verdant avenues. The fortifications, therefore, if they did not stop the Prussian army twenty years ago, have been useful in peace, if not in war; for, had they not existed, there could have been no open space around the city for the construction of a Ringstrasse, and Vienna would have been the poorer by its finest thoroughfare; while, from a sanitary point of view, it had been bereft of a healthy breathing apparatus. We doubt, indeed, if ever fortifications were put to a better use.

Viennese life has much of the *élan* of Paris life, while being peculiarly its own. The warmer climate permits of more outdoor recreation, and consequently café and "Vauxhall life" are found in perfection; music is a part of the existence of a Viennese citizen, and waltzing is not an accomplishment, but a custom. The busy streets have a tinge of Eastern life about them—Turks from Constantinople, Greeks from the Levant, and turbaned Armenian Jews are occasionally met. The Graben, Kohlenmarkt, and Kärntner Strasse are always bustling and lively, the Viennese cab-driver contributing thereto his fair quota, for he usually drives a pair, and, with the loosest of reins, maintains his steeds at a hand gallop through the streets, let them be wide or narrow. The handsome Opera Ring (a bit of the Ringstrasse where the Opera is situated) forms a magnificent promenade, and so does the Volksgarten, which abuts the same circular street a little farther on. Verily, there is but one Kaiserstadt and only one Ringstrasse.

The name of Angerer has long been associated with the Kaiserstadt. It was not Herr Victor Angerer, however, but his brother, who first enjoyed the title of Court-photographer. The present principal is one of the most genial of men—suave, polite, and eminently good-natured. He is a keen sportsman, and a

great fisherman, besides being an accomplished photographer. A more unpretending, courteous gentleman it has not been our lot to meet.

We visited the Angerer studio ten years ago. Then the glass-room was entirely of blue glass—perhaps the only establishment that has ever been glazed throughout in this manner; but, whatever theory may say as to the benefits to be derived from such illumination, in practice white light has decidedly the advantage; the blue-glass studio of Angerer exists no longer. The present glass-room of the Court-photographer is very spacious and lofty, and, strange to say, it is the only instance we remember of a studio being “downstairs,” for thither we are at once invited to meet our host.

But though asked downstairs, we do not leave the waiting room for the moment, and for this reason. A young lady and gentleman have just come from the studio, and are now at the further end of the room in conversation with a clerk who holds a ledger before him in his hands. The gentleman is arrayed in a tie of snowy whiteness, and the young lady, in bridal attire, carries a bouquet. They have been photographed in anticipation of the wedding, and are a little flurried; the lady evidently thinks the man with the book means marrying them out of hand, and perhaps a passing thought that she has been inveigled here for the purpose crosses her mind. In any case, she will have nothing to do with the clerk. The gentleman is equally timid, and objects flatly to give either his name or address, under the impression that he is being taken advantage of. “I have paid, and that’s enough,” cries the bridegroom. “But, sir, we must have some address to which we can send proofs,” urges the book-keeper. The customer begins to see there is some force in this argument; but after a moment’s thought he relapses into his fit of obstinacy again. “No, you don’t want any address; I will call,” and away rush the timid lovers.

The studio where Herr Angerer bids us welcome is said to be the largest in Vienna. It measures fifty-four feet in length, and at its highest is twenty-five feet. A gallery runs along the top of the room, which then slopes gradually down to the glazed side-wall, looking into a cheerful garden. Indian straw-matting is hung about the room, forming alcoves here and there—under the gallery—and altogether the apartment has the appearance of a fine conservatory or palm-house. Blue hangings are to be

seen on the glass side, while brown hangings for the most part are on the other. For backgrounds, too, Angerer occasionally employs screens of straw or cane, such as are to be found in drawing-rooms, and in this way he produces portraits that seem to be taken at home. One movable screen we saw was very practicable, as it permitted the lighting up of the lower part of the sitter's garments most effectually. It was simply a stand with two movable surfaces, the top being of light blue, and the bottom of white, as shown in our sketch (fig. 1). Herr Angerer



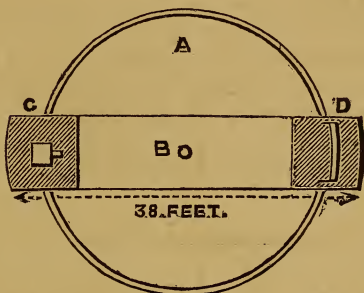
Fig. 1.

always poses, and indeed is a very hard worker in the studio.

We walk out into the garden. There is here a Swiss *châlet* or garden-house, with balcony, &c., erected solely for the purpose of taking groups and out-door pictures. It is painted a dark grey, the best colour, Herr Angerer finds, for a photographic background in the open. But what our host desires more particularly to show us is his enlarging apparatus, which is a wonderful structure. Imagine a turn-table, as large as those to be seen on our lines of railway; rails are laid down in a circle, and this big table on wheels then turns on its axis. The diameter of this circular table is no less than 38 feet. At one point, on the circumference, of this table is located the camera, with a recess or alcove built over it, and directly opposite, at the other margin of the table, is another small structure, under which the picture to be copied is placed. Here is a sketch of the whole arrangement (fig. 2). The camera under its alcove can be advanced and retired at will towards the picture. As both the camera and picture are in this way boarded over, no objectionable rays of

light can strike either one or the other, while from the fact that the table carrying camera and picture can be turned in any direction, it is possible to choose the very best light for the

Fig. 2.



A is the turntable, B is the pivot, C is the camera, and D the picture to be copied.

object. The photographer focusses the picture, and then, while still gazing at it on the focussing glass, gives the word to his assistants to revolve the turn-table; when the lighting is at its best, he cries "Halt!" the table is fixed, and the exposure is made. No rays but direct rays fall upon the picture. Certainly the arrangement is very perfect, and it is carried out on a grand scale.

"I only wish I could print faster," says Herr Angerer, alluding to his large negatives of four and five feet that stand here in their frames in deep shadow. Both silver and carbon printing—the only place in Vienna where we saw carbon printing—are here in operation; but Herr Angerer cannot get satisfactory results, he says, unless the light is very diffused; and this brings us to the subject of enlargements, which Herr Angerer produces in a different way to that in vogue in this country. Moreover, when we detailed our usual method of making a small transparency in carbon to begin with, he replied that he had tried it repeatedly, but that it did not yield him such perfect results as his own plan. This is, to make from the small negative a large collodion positive, in the first instance, which is done in a dark-room fitted up like a huge camera; from this collodion positive, after careful retouching, is printed in a printing-frame a carbon print, which is developed on a glass plate. This large carbon impression on glass is of course negative, and rarely requires further touching before being employed to produce the finished

print. The elaborate retouching is all on the first collodion positive, and not upon the carbon negative, and Herr Angerer believes that when the retouching has been thus translated, the finished effect is better.

Dark rooms and developing rooms open from the studio, which, as we have said, is "downstairs," from the front of the house, although on a level with the back garden; so that the washing rooms and laboratories are half-cellars, exquisitely cool and dark. Herr Angerer employs for his washing, fixing, and toning baths, very large but very shallow wooden tubs, like low washing tubs, which are, indeed, exceedingly practical.

STUDIO IN HUNGARY.

HERR KOLLER IN PESTH.

"MIND you hear some Hungarian music," says Dr. Eder, as we shake hands at the Northern Railway Station in Vienna; "you get it to perfection in Pesth." We make a mental note of the advice, and our pleasant anticipations add something, no doubt, to the admiration with which we regard the beautiful country that lies between the capitals of Austria and Hungary. Now and then there are glimpses of the broad, placid Danube and its green banks, with tiny villages grouped here and there—the churches surmounted by shining cupolas, which remind us more vividly than aught else that we are travelling in Eastern Europe. Near Pressburg we pass through miles and miles of vineyards; hill and dale are covered with the bright green vine, beyond which the dazzling white houses and red roofs of the town are just visible. Presently the hills grow bigger and become more rugged; the railway winds in and out beside vast precipices and giant peaks. We are among the Carpathians, and a magnificent range of mountains they are, viewing them at close quarters like this. By-and-bye, these lofty black pyramids are left behind, and the blue Danube favours us with its company once more. It is blue, of course, only in the sense that invisible

green is green. But it is getting dusk now, and all one sees is a broad, steel-like band in the moonlight, beyond which rise the dark irregular outlines of the Carpathians.

The proverb tells us, "All cats are grey in the dark," and it may be said with almost equal truth that all strange cities appear beautiful by night; and if this holds good with most towns, Buda Pest, which takes rank as one of the finest of European capitals, is naturally enough still further enhanced. Indeed, to the stranger who arrives on a moonlight night, who walks the acacia-bordered quays (for the broad Danube flows straight through the city), and watches the dotted lights of Buda opposite, their lurid reflection in the water at his feet—who sees the mighty fortress rising aloft in the gloom, all the more stupendous because of its indistinctness—the glitter of the Palace across the water, the lamps of the bridges, the tall stone buildings that rise at every corner, the broad, lighted squares, the summer cafés—all life, mirrors, and bustle—he who sees all this must perforce believe he has entered an enchanted city; and the idea becomes stronger still when he alights at the broad steps of the hotel, and, looking beyond the corridor, sees a magnificent stone square, filled with white-clothed tables, flowers, lights, and music, where mortals are gaily supping in a scene all brightness and animation.

There is a reverse side to the picture, it is true. Our room is on the third floor, looking into the square, and we open the windows to gaze down upon the sparkling scene, and listen to the Hungarian music we have been told to heed. It is pleasant, very pleasant: but when we have heard a dozen instrumental pieces, have supped our fill, and have retired to rest, we begin to think the music might be hushed with advantage. The day's travelling has been heavy, and we yearn for a good sleep; but midnight strikes, and the Hungarian music below is still in full swing. Next night there is as much and more of the Magyar strains, for it is a military band this time that comes and plays under our roof till the small hours. We begin to think that there was no need for Dr. Eder's advice, after all.

And now the national music is off our mind, we will give our reason for coming to Pesth. Eight years ago a charming collection of photographs forwarded to Pall Mall from the "Seven Mountains," by Herr Koller, were very justly rewarded with a medal. Herr Koller, we heard, had settled in Pesth, and,

as might have been expected, he at once took the lead among photographers in the Hungarian capital. Since we had a desire to visit one of the first studios in the kingdom of Hungary, we wrote to Herr Koller to receive us. He consented, and hence our visit.

A thorough chemist, a man of highly-cultivated taste, Herr Koller has a most amiable and winning manner. That his work is that of a master is known to our readers who saw the photographs we allude to; but to view the conditions under which that work is done is to see one example the more that it is the man, and not the tools, that makes the mark. "You have never seen such a glass-room as this, I am sure," says Herr Koller, opening a door leading to the studio. We look round. It is surrounded on all sides by lofty buildings, and there is no clear view except over-head. Still, we jokingly reply that we have: "At one of our prisons in London—Millbank, a place like your Kufstein—there is a studio with just such high walls on every side."

Herr Koller's studio is singular in this respect: *there is no side-light at all*. It has a large, low roof of glass, and all the illumination that enters gets in through the roof. Herr Koller may be said to out-Luckardt Luckardt in respect to lowness of roof; it has very little slope, and the greater portion is clear glass. The walls of the studio are painted—the upper portion a light blue, and the lower a dark brown. Of course, there are curtains; but, as a rule, only a light screen is used to modify the light upon the sitter. The illumination of the room, at its best, is never bright; but the light, if dull, is soft and pleasant, and is at once fit for photographic portraiture with very slight modifications.

As we have said, the studio is surrounded by walls. These are at a distance of some sixty or eighty feet, and rise skyward to a great height. He has painted these distant walls blue (or prevailed upon his neighbours to do so), "and for this reason," says Herr Koller, "there is more light in the studio than is at first apparent. Sometimes, when I come in from the front, I wonder where the light is; but it is so diffused and manageable that I find I can take a portrait in any part of the room almost at any time of the day."

His exposures, nevertheless, are rather longer than elsewhere. He is well satisfied if he can make a cabinet picture with an

exposure of twenty to twenty-two seconds. Like Luckardt, he works very much to secure delicate details in the drapery of his sitters, and the subdued, diffused light of the studio appears to have much to do with success in this respect. Our readers may remember the in-door groups and interiors of Herr Koller, which secured him the medal at Pall Mall; their strong point was the marvellous detail in the shadows, and the absence of all inky blotches in corners and recesses. These effects are due to working with a more uniform light than that employed by most photographers.

In Buda Pest, which, it must be remembered, is the biggest city in a line between Vienna and Constantinople, there is as much life and gaiety as in any other European capital, while the people are more busy and go-a-head in their notions than their German neighbours. One sees this in photography, and Paris and London might take a lesson from Buda Pest in some respects. The finish of the pictures, the elegant mountings, and the assortment of styles is noteworthy in the show-cases of even second and third-class studios. The slender promenade or panel—termed the *Makart*—is, perhaps, more popular here than in any locality in Europe; while the boudoir, which is very slow in making way with us, is almost as well known as the cabinet.

Herr Koller will accept an order for a single promenade portrait, and for this the sitter pays eight florins (roughly, sixteen shillings); then further copies are charged at a reasonable rate—namely, one and a-half florins (three shillings each). In these circumstances a dozen promenades cost forty-eight shillings—or, perhaps, more strictly speaking, forty-five—a price that compares favourably with other European studios *du premier rang*. This plan of charging for the first copy is a very good way of getting over the proof difficulty, as also the dislike of a customer for his portrait after he has paid for it. If he objects to the picture, he has always the consolation of knowing he has not disbursed a very large amount, and if he desires to re-sit, he can do so at no great cost. At Herr Koller's establishment, as in Berlin, there is a counting-house attached to the studio, into which the customer first enters; this *comptoir* gives quite a business aspect to the undertaking which is absent from our British studios.

Herr Koller makes a speciality of one form of portrait, for which he receives orders frequently from places as far distant

as Paris. This portrait is exquisitely coloured, very fine and transparent in nature, and does not usually measure more than twenty inches. Herr Koller puts a specimen in our hands, and asks us to guess how it is finished. It is a picture of two young girls with golden hair, and bright hazel eyes. Its delicacy and translucent character are something extraordinary. "Is it upon enamel, ivory, or porcelain?" we ask. Herr Koller shakes his head, and will show us how it is done. The method is not novel, he admits, and success lies in the execution, rather than anything else.

To get the transparent effect he has recourse to the method which photographers are aware gives this property with effect. He employs two pictures, one over the other, as has been proposed over and over again, the last time in connection with the ill-fated "Colour Company." Says Herr Koller: "Photography plays but a subordinate part, you will perceive: success mainly depends, as a matter of course, upon the skill of the painter engaged in colouring the picture." To begin with, a photographic print upon algæine paper is produced; this may be a direct impression, or it may be an enlargement. Algæine paper permits of the most exquisite work by the water-colour artist; it is thin, and easily rendered transparent. The paper print is finely painted, and then placed upon a sheet of glass. It is now ready for treatment with an encaustic paste. "This," says our host, "is a preparation of my own, and made up with gum-dammar and Canada balsam." The whole surface of the coloured picture as it stands upon the glass is covered with the mixture, and submitted to a tolerably high temperature, which has the effect of impregnating the picture through and through with the compound, rendering the paper transparent, while it seems to heighten the brilliancy of the colours. The semi-transparent coloured portrait at this stage does not possess any particularly good effect—it looks, in fact, rather disagreeable, and it is only when it is placed over another roughly-painted sheet—the paper, in this case, being thick and coarse, and the colour only applied in patches—that the charming effect we have alluded to is produced. Herr Koller has firm faith in the permanence of the photographic portion of his picture for two reasons: there is no albumen, and there is the great protection afforded by the encaustic preparation. Herr Koller has made the process his own, and the labour he has spent in perfecting it has certainly not been thrown away.

STUDIOS IN BAVARIA.

HERR HOF-PHOTOGRAPH JOSEF ALBERT IN MUNICH.

THEY are early people in Munich. There is no need to wait until noon to make a call for fear you may interfere with the commencement of the daily labour. At nine o'clock you will find the busy establishments here in full swing, and, possibly, if you ventured there at eight, nobody would feel put out but yourself. Going to work so early reminds one of the visit of the Emperor of Brazil some two years ago, when his Imperial Majesty always began the serious labours of the day about six. The comic papers, we remember, made very merry over the Emperor being up betimes, and published humorous diaries of what was done in the small hours; but it was not such fun for those who had to rise from a comfortable bed, hours before their wont, to attend upon his Majesty. We ourselves were called upon to explain the various applications of photography to military purposes while the morning air was still raw and chill, and, before seven, had gone through a demonstration of the carbon process to his Majesty's entire satisfaction, if not to our own. Herr Albert, it seems, has done a good deal of work for the Emperor of Brazil, and, we believe, holds an appointment under his Majesty. Thus it comes about that early rising and photography are coupled in our minds as we are here in Munich, paying a visit "At Home."

Mr. Court-Photographer Joseph Albert has his establishment in one of the best streets in Munich, the Karlstrasse. He holds high rank as a portraitist, and as we pass into the broad entrance, between handsome columns, we see many magnificent examples of his work. The reception room is small, but well appointed, and on the walls are some large direct portraits with six-inch heads, as well as some highly-finished enlargements, all of them of notable persons. The Emperors of Germany, Russia, and Austria, the boy-like King of Bavaria, as well as potentates from Saxony and Hanover, are here represented, from negatives taken by Herr Albert himself. All the prints are, however, in silver, and there is not a single example of carbon printing on the walls. Herr Albert prints either by silver or by Lichtdtuck, and, if you

like, he will take you a carte portrait and furnish you with five hundred copies of it for thirty marks, or thirty shillings; a thousand copies cost £2 10s. ; or, if it is a cabinet portrait, then a thousand copies cost £3 10s. The prints are only upon writing paper if delivered at this price, and thick plate paper or cardboard pictures would, naturally enough, cost more. For glazing, an extra twenty per cent. is charged.

We must not, however, lead our readers to suppose that very high class Lichtdruck portraits are furnished for this amount. As most of us know very well, to give good Lichtdruck impressions, not only must the negative be suitable, but the object as well. A gentleman in a black hat and black coat could not be satisfactorily reproduced by Lichtdruck except under much difficulty, and in ordinary circumstances people who know what silver prints are would not be satisfied with impressions in Lichtdruck. In a word, while very much can be done in collotype printing, and, in the case of reproductions of paintings, &c., the most satisfactory prints produced, we have not yet got so far as to print off ordinary portraits by steam; and when Lichtdrucks are particularly well done, we may be sure no pains or time have been spared in their production.

Collotype printing is not merely done by hand-presses now-a-days, but by machinery; and here across the yard we see two so-called *Schnellpressen* (quick presses) at work. A gas-engine of six-horse power is employed to drive the machines, and each machine requires the attention of a skilled mechanic and a girl. The press is very like the lithographic quick-press with which some of our readers are doubtless acquainted. Upon a big steel bed lies the little collotype printing block. It is a piece of glass nearly half-an-inch thick, its uppermost surface carrying the bichromated gelatine image. The block seems very small for so large a press, for, as the metal bed moves to and fro, and the big cylinder that carries the paper revolves, only a double cabinet print results therefrom. The mountain moves, and a mouse issues forth. It takes, perhaps, a minute to produce the pair of prints. At this particular machine they are printing copies of *Schützenlisl*, a work just now much in request by the Munich public. The negative is from a huge painting of a Munich beer-girl—a lively young person indigenous to the soil, who trips about among her patrons with half-a-dozen foaming tankards in each hand—and as there is a good deal of gradation,

and large quantities are required quickly and cheaply, the Schnell-press is employed in preference to the slower and more accurate hand machine.

Let us watch the printing for a moment. The glass printing block, with its brownish film gelatine, moves horizontally to and fro, and, as it does so, passes under half-a-dozen ink rollers, which not only apply ink, but disperse it. Some of the rollers are of leather, and some of glue, and whenever the printing block retires from underneath them, an inked slab takes the place of the block, and imparts more ink to the rollers. It is the man's duty to see that the ink is duly carried to the rollers, and applied by the latter in sufficient quantity; while to the girl, who stands at some height above the machine, falls the task of placing a sheet of paper around a huge cylinder, which, in revolving, presses against the block, and thus secures an impression on the paper. Sometimes as many as eight different rollers are employed for inking—the surface of the block being touched by all as it passes underneath them—for the difficulty in working by machinery is to apply the ink as delicately and equally as possible.

It is necessary at intervals to damp the block, and when the printer in charge finds this to be the case, he stops his press for a few minutes. The gelatine film from the first has been impregnated with a little glycerine, which serves to retain moisture, and now a little more glycerine and water are applied by means either of a cloth or sponge. Then, previously to resuming work, a leather roller is passed over, to remove surplus moisture, and the block is again ready for printing.

The quick presses in use at the Albert establishment will produce from 800 to 2,000 copies a day, but, as we said before, the work is obviously not so fine as that produced by a careful printer with a hand-press. At the same time, there is a vast amount of work that naturally falls to the lot of the Schnellpress. The printing of pictures for catalogues offers a wide field. Hatters, ironmongers, engineers, bookbinders, tailors, furniture-dealers, &c., &c., are all beginning to find out the value of photographic illustrations, and Lichtdruck renders great service in permitting them to place before the public representations of objects for sale in a most novel and satisfactory manner.

The actual preparation of the printing blocks we detail in our "At Homes" at Herr Obernetter of Munich, and Herr

Löwy at Vienna, merely remarking here that Herr Albert, no more than his colleagues, does not practise the old method of Lichtdruck, in which two films of bichromated gelatine are applied. Herr Albert's original plan—and he was the first to employ Lichtdruck practically, if we except Garnier's beautiful process—was to apply a preliminary coating of bichromated gelatine to the thick glass plate, the film being exposed through the back of the glass, and thus rendered insoluble and tightly cemented to the surface; this firm film served as a basis for the second sensitive coating that was afterwards impressed by the negative. This double treatment of the thick glass plate is now definitely abandoned in most Lichtdruck establishments, and, instead, a preliminary coating of soluble silicate and white of egg dissolved in water is employed. This solution must be very dilute, it must be prepared fresh, and last, but not least, the silicate must be entirely free from caustic potash; otherwise the result is never perfect. The preliminary film is exceedingly thin, and prior to the application of the bichromated gelatine it is rinsed with water, so that an open porous surface may be obtained. The printing, which is done in an ordinary printing frame, is usually conducted with a stripped negative, but a reversed negative taken on patent plate can be pressed sufficiently in contact to give a sharp impression.

Most Lichtdruck prints are treated with shellac varnish after drying, and in this way are made to look very much like silver prints, for which they are frequently sold. Carefully printed Lichtdrucks on matt plate paper are not varnished, these being generally used for book illustrations.

We pass from the Schnellpress room into the ordinary silver printing room, where a revolving table for vignettes at once attracts notice. It is a round table about four feet in diameter, upon which the printing frames are laid. The motive power is a large clock, or rather the works of one, the clock being set in motion by two heavy weights, such as one sees attached to the ordinary Dutch clock. "It is a very simple affair," says our friend; "I constructed it myself. The table moves very slowly, but goes on all day, if you pull up the weights occasionally." We saw the vignettes thus automatically printed, and they were very finely graduated.

In Herr Albert's establishment, the cabinet portrait style is most favoured by the public, the charge made for a dozen pictures

being 27 marks or shillings; but then Munich, it must be remembered, is altogether a cheap city.

Some specimens of colour printing in Herr Albert's studio deserve mention. Herr Albert has been experimenting with some success on the method which is usually connected with the name of Ducos du Hauron. A painting is photographed three times; the first negative is taken through a red screen, the second through a blue screen, and the third through a yellow screen. Albert employs coloured liquids for his screens, and in this way he secures three negatives, in the taking of which respectively the rays of the three primary colours have been absorbed. The negative taken through the red screen is then printed upon red carbon tissue, and the other two negatives printed respectively with blue and yellow tissue. Then the three prints in red, yellow, and blue are superposed, and the picture is finished. By working in this way, Herr Albert claims to have reproduced a coloured picture of Lemer cier, which had been produced from eighteen stones (and therefore contained eighteen different tints) in all its pristine beauty. As the original was not at hand for comparison, it was impossible to say how far success had been secured, but certainly the Albert pictures are very pleasing and interesting. To talk of the process as one of photographing in natural colours is of course nonsense, for there is no relation between the colours absorbed by the screens and the particular pigment which happens to be in the carbon tissue; but, as an important experiment, the matter deserves notice. But more satisfactory still than the compound pictures in colours was a compound picture we saw (from the three negatives) printed in monochrome or sepia; the painting was here reproduced far more satisfactorily than when a single negative only was employed for printing. In effect, the colours of the original picture appeared to have been more truthfully translated into monotone by taking three negatives under the particular conditions; so harmonious, indeed, was the result, that we should not be surprised if in future, in the photographing of paintings, recourse is not had to this particular method, or a modification of it.

HERR J. OBERNETTER IN MUNICH.

WHETHER there is any truth in the proverb that work prospers most upon hallowed ground, we know not; but we can say this

much, at any rate, that we did not see better Lichtdruck work during our recent tour in Europe than that met with in Herr Obernetter's establishment. If not situated in the Senefelder Strasse itself, the printing-rooms are within a stone's throw of the thoroughfare named after the discoverer of lithography, and we may surely expect that if photo-lithography, collotype, and arts allied to lithography, are to be found anywhere in perfection, it is near the spot where Senefelder was born.

Be this as it may, Herr Obernetter—who enjoys the reputation of an ardent photo-chemist and experimentalist, not only in Germany, but wherever photography is known—has arrived at a wonderful pitch of excellence in his work. He has no *Schnellpress* on the premises, but only hand-presses; but then his aim is more to do the best work, rather than much of it; that is to say, his principal work lies in the printing of negatives from nature, rather than the printing of negatives of pictures, engravings, &c.; and everybody conversant with mechanical printing knows the former to be the more difficult. Doubtless Herr Obernetter requires a higher price for his work, for, in some cases, it proceeds very slowly indeed.

We need not here recapitulate the processes and formulæ of the Lichtdruck process, which, if not identical, are very similar indeed to those we have already given in our "At Home" at Herr Löwy, in Vienna. Here, as in that establishment, the main point is the preparation of bichromated gelatine images on the Lichtdruck plates, from which prints are struck off in the press. Herr Obernetter, since he only employs the slower and more careful hand-press, goes to work rather differently in the preparation of his Lichtdruck plates. Instead of the bichromated gelatine being applied to solid plate glass, half an inch thick, only patent plate of ordinary thickness is used. It is more handy of manipulation, and is better adapted to the common printing-frame. Afterwards, when taken to the press, the patent plate is laid upon a bed of plate glass, and in this way receives the necessary support.

Another thing that struck us was that the gelatine images upon the Lichtdruck plates were rather more yellow than those we saw in Vienna. The yellowness, it is true, was a mere tinge, but still those elsewhere were sometimes quite colourless, and this had been pointed out as a sign of perfection. Herr Obernetter's work proves, at any rate, that the yellowish tinge is by no means inseparable from good results.

The laboratory, washing room, drying-cupboards, &c., are all on the basement, and here, too, are the reproductions of negatives made by the graphite process, to the excellence of which Herr Obernetter called attention six or seven years ago, and which then, as now, is one of the most valuable reproducing methods we have. A great many of the clichés Herr Obernetter receives have to be reproduced before they can be transformed into Lichtdruck plates, and he employs either the wet collodion process or the graphite method, according to circumstances. If he desires to make the copy softer than the original, he employs collodion; if he desires to infuse vigour, and make the copy stronger than the original, he uses graphite. The qualities of the gelatino-bromide process he does not think lend themselves to making reproductions suitable for Lichtdruck.

If a negative is otherwise satisfactory, it usually requires stripping, an operation performed in the simplest manner. The negative is put upon a levelling stand, and fluid gelatine of tolerable consistence poured over it. When dry, a penknife is run round the margin, and the film leaves the glass without any trouble. A stripped film is always preferred for printing the Lichtdruck impression; since, with pressure, there is no difficulty about getting perfect contact; where fine detail exists, this is absolutely necessary. A large series of Lichtdruck plates ready for printing are passed in review, some of them exceedingly delicate. "We are satisfied if we get from 100 to 400 copies from plates like these," says the manager of the laboratory; "as there is no difficulty now in making the plates, we never push the printing too far."

We walk upstairs into the printing room. Here are a dozen presses at work, all of them known by the name of the *Star* or *Stern-press*. They are small lithographic presses, one man sufficing to work them, who turns a revolving wheel, which reminds one of steering a ship. As we have said, the Lichtdruck plate, gelatine image upwards, is laid upon a sheet of plate glass by way of bed, the film having first been treated with glycerine and water, as we have previously described. The work is very similar to lithography, except that more time and care are spent over it. In the first place, a moist sponge is rubbed over the surface; then comes a soft wash-leather roller, whose surface is soft and of the appearance of crêpe, which is rolled over the Lichtdruck plate two or three times to remove surplus

moisture. The ink rollers that are now applied are of glue composition, and as the impression requires two inks—it is a Pompeian window—the thick ink is first put on. The roller is not passed once, but half a dozen times at least over the plate, and then another roller charged with thin ink is applied in the same manner. It takes fully five minutes to sponge and roll up the plate, the rolling being done gently, but firmly. A sheet of paper is now laid upon the plate, the tympan lowered, and the scraper adjusted with due pressure; a revolution of the wheel completes the printing, the well-known scraping action of the lithographic press being used in the operation.

A more gentle and time-taking process still is in operation at the next hand-press. Here is a delicate interior (from nature), and the printer, one of the skilful hands, is paying it great attention. Not only does he spend more time over the sponging and rolling up, but the paper for the print is carefully laid on, tamped with the fingers on the back, and then gently rubbed with the palm of the hand, before the tympan is lowered and pressure applied. Altogether it is a most delicate process, and we question whether a dozen prints per hour are pulled. But they are very fine and perfect pictures that result.

Some of the prints are taken on thick plate paper, and are then ready for binding without further ado; these are usually for book illustrations. Other pictures, that are to pass muster among silver photographs, are, on the other hand, printed upon fine, thin paper, and then varnished and pressed to impart to them a better surface. The varnishing is done by first sizing in a thin solution of gelatine, and then dipping in a solution of shellac in spirit.

Another class of work is the printing of little vignetted photographs upon note and letter paper. Everybody is acquainted with the pictorial letter paper, sold at a penny a sheet at all spas and tourist resorts, each sheet having, by way of heading, a coarse engraving of some local spot or building of interest. A German publisher has conceived the idea of printing real photographs, instead of these woodcuts, upon letter paper, and at one of the presses here a collotype printer is printing off such copies at the rate of about sixty an hour.

We pass on through the varnishing-room into the photographic studio. As no portraits are taken here, but it serves simply for making reproductions, the only aim has been to make

the apartment as light as possible. The photographer attached to the establishment is engaged upon wet-plate work. He does not albumenize before coating with collodion, but prefers well-polished plates, which, he avows, are better produced by rubbing with thin Chinese paper and a little old collodion, than in any other way. Chinese paper does not give rise to loose fluff and fibre, like fabric—a point that may well be noted.

Here is Obernetter's graphite process for reproducing negatives. A patent plate is coated with the following, when filtered:—

Dextrine	...	...	...	...	62 grains
Ordinary white sugar			...	...	77 „
Bichromate of ammonia			...	...	30·8 „
Water...	...	...	...	...	3·21 ounces
Glycerine	...	...	...	...	2 to 8 drops

The film is dried at a temperature of 130° to 140° F., in about ten minutes, and while still warm is printed under a negative in diffused light for a period of five to fifteen minutes. In a well-timed print, the image is slightly visible; the plate is again warmed a little above atmospheric temperature in a darkened room, and then fine levigated graphite is applied with a fine dusting brush, a sheet of white paper being put underneath to judge of the effect.

Breathing upon the plate renders it more capable of attracting the powder. When the desired vigour has been attained, the superfluous powder is dusted off, and the plate is coated with normal collodion. Afterwards the film is cut through at the margins of the plate by means of a sharp knife, and put into water. In a little while—from two to five minutes—the collodion with the image will be detached from the glass; the film is at once turned over in the water, and brought out upon the glass plate. Under a soft jet of water any air-bubbles that may exist between the collodion and the glass are removed, and then the image is poured over with a thin solution of gum-arabic (two grammes of gum dissolved in one hundred grammes of water), and allowed to dry spontaneously in an upright position.

STUDIO IN BELGIUM.

M. GERUZET IN THE RUE DE L'ECUYER, BRUSSELS.

M. GERUZET enjoys a distinction of which he may well be proud. Of all portraitists on the Continent of Europe, he is the only one who prints his work in carbon, and in carbon alone. "I made a vow, two years ago, to produce only permanent portraits," says M. Géruzet to us, "and I have since kept to it. If a better process than the carbon is brought forward, I shall be quite ready to adopt it, for printing in pigments is not unattended with difficulty; meanwhile I take the best process I can that will give me durable work."

All the prints, then, we see around us—from tiny carte to life-size pictures—are printed in permanent pigments. "What of their quality?" it will be asked. Our reply is that M. Géruzet, five years ago, was in the first rank of portraitists in the Belgian capital, and in that position he is still as firm as ever. It may be that in small work the impressions are less bright and pretty, occasionally, than might be produced from highly-albumenized paper of roseate hue, as M. Géruzet himself readily admits; but, among the many prints we critically examined at the studio, there were none that were anything but satisfactory, while, in many cases, it would have puzzled an expert to say whether silver or pigment constituted the impression.

We shall say but little of M. Géruzet's studio, into which we were first invited, for the simple reason that we desire to do justice to the carbon operations in progress at the establishment. Suffice it to say that M. Géruzet employs now only the gelatino-bromide process. He purchases the dried pellicle always, and dissolves it for use as required; and he uses none other than oxalate development. For carbon printing he thinks, indeed, that oxalate development is imperative; but a daily experience of eighteen months has proved to him its superiority over the pyrogallic developer in many ways. In this respect, by-the-bye, M. Géruzet does not differ from his brethren in Brussels and in Paris, for, at the chief ateliers in the French capital—Benque, Van Bosch, Lejeune, Waléry, Nadar—the oxalate developer is also in favour. It is so difficult to judge the printing density of a pyrogallic negative, and, since the whole

success of a carbon print depends upon this, it is naturally a matter of the first importance. "Non, non," says M. Géruzet, emphatically, "pas de pyro."

The sensitizing of the tissue is conducted in the cool domain of the cellar. The solution of bichromate varies from 3 to 5 per cent. in strength, the tissue, as it comes from the bath, being gently squeegeed on a glass plate to remove the superfluous liquid. It is contact with the bichromate solution that is one of the most vexatious drawbacks of the carbon process, for one cannot but admit it is injurious to health. To take care that the skin is touched by the solution as seldom as possible is one of the standing precautions; but it is not so easy for a principal to get his assistants to carry out even regulations provided for their benefit. The temperature at Brussels in the summer, and also in spring, is often so warm that the sensitizing of the tissue cannot be carried on uninterruptedly in an ordinary room, for gelatine runs when the thermometer points to 90° F. or thereabouts. At the same time, after thoroughly draining and squeegeeing, the tissue is found to set so quickly, that within ten minutes or a quarter-of-an-hour of its being sensitized it can be carried into one of the upper rooms to dry. Heat is now a matter of little consequence, so long as there is a good current of air; and M. Géruzet allows the drying to go on as quickly as possible. Keeping the tissue for twenty-four hours after sensitizing, instead of being hurtful, is, in some conditions of the tissue, a positive advantage. But this question is a matter in which experience is the only guide.

We now proceed to the printing-shed on the roof, and here a singular sight presents itself. There are probably five hundred small negatives printing, and yet not a single printing-frame. The printing is conducted in the open, but in the shade. "Many talk of the comparative rapidity of carbon printing," says M. Géruzet; "but, practically speaking, owing to the care necessary in the operation, the work does not go on more quickly than the production of good silver prints."

We have said that no printing-frames are used. Each carte or cabinet is simply made fast to an under glass by means of two or three American clips. A piece of pigment tissue is put under the negative; this is backed up by half-a-dozen pieces of red blotting-paper to act as a pad, and the whole clamped between the two glasses. It is the simplest arrangement con-

ceivable. Since it is never necessary to look at an impression in course of printing, the whole *raison d'être* of a complicated pressure-frame disappears, the negatives can be closely packed in rows on the printing-board, and, when printed, the process of changing the tissue of a hundred negatives or so is but the work of a few minutes.

Every negative has gummed round it a paper margin or mask, so that an unexposed border of tissue is around every print. The negatives are examined by the printer before the printing commences, and he estimates their density; they are then put in closely-serried rows upon the printing-board, according to the density they present. Thus one row will remain exposed to light until the photometer—Marion's photometer is employed—records five degrees, another row until six is recorded, and so on. M. Géruzet, by means of the oxalate developer, can now control the density of his negatives so well that they all range between five and eight degrees.

We will now follow a batch of exposed pieces of tissue to the developing room. This is a sombre apartment with plenty of water, warm and cold, laid on. The development of the prints takes place on sheets of opal glass measuring about 12 by 10 inches. The surface of the opal is polished, and this first receives a preliminary coating of white wax, which is simply rubbed on and off again; afterwards thin normal collodion is poured on, and the plate put into cold water until the greasiness of the surface has disappeared. Here in a shallow bath of cold water are half-a-dozen such prepared plates ready at hand for development.

Six or eight small pieces of the printed tissue are now thrown into cold water,* and, when thoroughly soaked, say in two minutes, they are pressed, of course face downwards, upon the wet opal plate. A little while elapses, to permit the tissue to become firmly adherent to the glass, and then immersion in warm water follows. The temperature of this water, as most of our readers know, must depend to some extent on the tissue, whether it is fresh or stale, but 90° to 95° F. is the usual warmth. All the pieces of tissue are supposed to have received the same amount of printing, and should, therefore, develop simultaneously,

* With very fine work, it is well to coat the printed tissue also with collodion, prior to its immersion in cold water for development.

but this does not happen in practice. It becomes necessary to hasten the washing of the more tardy images, and this is done by using ammonia. A coffee-pot-looking utensil stands close at hand containing warm water to which a little ammonia has been added, and this mixture is carefully poured over the surface of those prints from which the superfluous pigment refuses to wash away. In this way the development is at once accelerated, and the manipulation of half a dozen impressions can be proceeded with at the same time.

The white opal surface, of course, permits one to judge of the success of the print on development, and we need scarcely say that this part of the process is the most difficult and crucial of all. Besides skill and experience, the carbon printer must have an inexhaustible amount of patience. "If you will only wait, you will get what you want," is a proverb that the carbon worker must have closely at heart, for it may happen that he has to develop half-a-dozen impressions before securing that pitch of perfection he desires. Fifty per cent. of failures M. G  ruset would probably take as a low estimate; in any case, however frequent failure may arise, he pushes on until success at last attends his efforts.

The application of gelatined paper to the developed prints when dry, and stripping the latter from the glass surface, are matters of less moment. M. G  ruset employs fresh paste for mounting, but with carbon prints, obviously, this operation plays a far less important r  le than when silver impressions are under consideration.

We have only referred to the printing of small work, for it is in this that so many photographers have failed. M. G  ruset succeeds where others do not, for the simple reason that he has a larger stock of patience, and has the courage to condemn all but first class work. As we have said, among the vast collection of prints we saw, there was not one picture that was unsatisfactory; but this was due to the fact that he destroys all mediocre pictures. In saying this, we do not desire to underrate M. G  ruset's experience, skill, and keen judgment on points connected with carbon printing, but we are sure that these would never have led him to success unless he possessed much courage and patience into the bargain.

I N D E X.

- Abney, Captain, at South Kensington, London, 55
Adam-Salomon, M., in Paris, 202
Adèle, Atelier, at Vienna, 250
Albert, Herr Josef, at Munich, 267
Angerer, Herr Victor, at Vienna, 258
Annan, Messrs. T. and R., at Glasgow, 198
Autotype Works, Ealing, London, 29
Barton, Mr. W. Harvey, at Bristol, 171
Basano, Alexander, Mr., in Old Bond Street, London, 80
Bedford, Francis, Mr., at Camden Town, London, 9
Benque et Cie., MM., in Paris, 211
Blanchard, Valentine, Mr., in Regent Street, London, 59
Brown, Barnes, and Bell, Messrs., at Liverpool, 156
Downey, W. and D., Messrs., at Ebury Street, London, 19
Eder, Dr. J. M., at Vienna, 242
Electric Studio, Van der Weyde's, London, 72
Ellicott and Fry, Messrs., at Baker Street, London, 42
England, William, Mr., at Notting Hill, London, 14
Faulkner, Robert, Mr., in Baker Street, London, 68
Fergus, Mr. John, at Largs, 183
Fry, Elliott and, Messrs., at Baker Street, London, 42
Geruzet, M., at Brussels, 276
Grove, Window and, Messrs., at Baker Street, London, 92
Hills and Saunders, Messrs., at Porchester Terrace, London, 50
Huggins, Dr., at Upper Tulse Hill, London, 83
Hughes, Mr. Jabez, at Ryde, 132
Jennings, Payne, Mr., at West Dulwich, London, 23
Kew Observatory, 137
Koller, Herr, at Pesth, 262
Lafosse, M., at Manchester, 161
Laws, Mr. T. M., at Newcastle, 152
Lejune, Maison, at Paris, 218
Lowy, Herr, at Vienna, 253
Luckardt, Herr Fritz, in Vienna, 253
Mayall, Mr. J. E., at Brighton, 127
Mayland, Mr. W., in Regent Street, London, 101
Midwinter, Mr. W. H., at Bristol, 175
Millbank Prison, London, 11
Nadar, M., in Paris, 214
Observatory at Kew, 137
Obernetter, Herr, at Munich, 271
Pentonville Penitentiary, London, 119
Perlmutter, Herr, at the Atelier Adèle, Vienna, 250
Photo-lithographic Establishment, Woolwich, 64
Phototype Establishment in London, 110
Platinctype Company at Bromley Road, London, 76
Préfecture de la Police, at Paris, 222
Prison, Millbank, in London, 114
Prümm, Herr T., in Berlin, 232
Robinson, Mr. H. P., at Tunbridge Wells, 123
Russell and Sons, Messrs., at Worthing, 179
Saloman, Adam, M., in Paris, 202
Sarony Square at Scarborough, 146
Saunders, Messrs. Hills and, at Porchester Terrace, London, 50
Schaarwachter, Herr J. C., in Berlin, 227
Slingsby, Mr. Robert, at Lincoln, 142
Swan, Mr. J. W., at Newcastle, 165
Taylor, A. and G., Messrs., at Forest Hill, London, 37
Valentine and Sons, Messrs., at Dundee, 191
Wane, Mr. Marshall, at Edinburgh, 187
Warnerke, Mr. L., at Champion Hill, London, 105
Weyde, Van der, Mr., in Regent Street, London, 72
Window and Grove, Messrs., at Baker Street, London, 92
Winter Brothers, Messrs., at Vienna, 245
Woodbury, W., Mr., at South Norwood, London, 44
Woodbury Permanent Printing Co., at Ealing, London, 96
Woolwich, Photo-lithographic Establishment, 64

*To Photographers, Crayon Artists,
Water Color Artists, Portrait
Painters, Workers in Pastel, Cray-
ons, and Amateurs:*

IT will pay you to write for my new reduced price-list of Photographic Stock and Artists' Materials of all kinds. Will send it free, to any address, on receipt of a request for the same. When you write for it, please inform me what branch of the business you are now engaged in. In making prices, I have endeavored to recollect that low prices for good goods make the best advertisement any business man can have.

Hoping to hear from every artist in the United States and Canada who has not already received it, I remain,

Yours truly,

W. R. REID,

Manufacturer, Importer, and Jobber of FINE ART GOODS of ALL kinds,

352 & 354 Euclid Avenue,

CLEVELAND, O.

W. D. GATCHEL & CO., LOUISVILLE, KY.

Have a Full and Complete Line of All
Articles required
by

Photographers

both regular workers and amateurs. Having largely increased our stock and facilities, we offer inducements that can not be excelled. We have supplied the West and South for the past

TWELVE YEARS,

and can furnish just what is wanted. We will supply

The BEST GOODS,

With HONEST LABELS,

At the LOWEST PRICES,

and deduct three per cent. for cash on all bills of \$10 00 and upward.

Send for Price-List.

W. D. GATCHEL & Co.,
309 W. Jefferson St., LOUISVILLE, KY.

A. M. COLLINS, SON & CO.

Manufacturers of all kinds of

CARDS AND CARDBOARDS

FOR

PHOTOGRAPHERS

WAREHOUSE:

No. 527 Arch Street

PHILADELPHIA

31,737 square feet of Store room.

The largest force of Employees.



Largest Stock in the United States.

Send for my late Catalogues.

PA. PITTSBURGH, PA.

JOHN I. SHAW,

Successor to J. W. Morrison,

MANUFACTURER AND DEALER IN

*Photographic Materials,
Cameras, etc., etc.,*

Nos. 10 & 12 Sixth Street,

PITTSBURGH, PA.

*Mouldings, Albums,
Oval, Square and Arch Top Frames,
Velvet and Combination Frames.*

—o—

**Photographic Dry Plates and Outfits for Amateurs
and Professionals.**

Everything required in the practice of
Photography in all its forms.

JOHN I. SHAW, PITTSBURGH, PA.

MILWAUKEE.

GUSTAVUS BODE,

NORTHWESTERN PHOTOGRAPHIC WAREHOUSE

and Chemical Laboratory,

11 Spring St., Milwaukee, Wis.

A FULL LINE OF

PHOTOGRAPHIC GOODS

AND ARTISTS' MATERIALS,

—EMBRACING—

*Apparatus, Chemicals, Glass,
Albumenized Papers,
Frames, Albums,
Views, &c.*

English, German and American Oil Colors, and all
Materials used in the fine Arts.

—SPECIALTY.—

Nitrate of Silver and Chloride of Gold made for photographic
purposes. Gold and Silver Wastes refined. Returns
made within two weeks. Satisfaction guaranteed.

SEND FOR PRICE-LIST.

Jordan & Sheen,
Successors to W. D. GATCHEL,
DEALERS IN

Paints & Varnishes

EASELS, FRAMES, MATS, ETC.,
168 RACE ST.,

CINCINNATI, O.

B **THE BEEBE DRY PLATE.** **B**

MANUFACTURED BY

J. B. Beebe, - - - Chicago.

—NEEDS NO RECOMMENDATIONS.—

FOR SALE BY ALL DEALERS.

CARBUTT'S

Keystone Dry Plates,

—*Guaranteed Perfect.*—

- J. C. B. The most sensitive and reliable Dry Plate in the market for quick exposures in the Gallery, and Outdoor Instantaneous Views ; 15 times wet plate rapidity.
- B. A. Universally reliable plate for either Gallery or Landscape work ; 6 times wet plate rapidity.
- A. Suitable for Transparencies and Landscapes ; twice the rapidity of wet plates.

Prices reduced and Quality Improved. For Sale by all Dealers.

Light in the Dark Room. Save your Eyesight.

CARBUTT'S MULTUM IN PARVO DRY PLATE LANTERN.

(Patented April 25th, 1882.)

Send for Illustrated Circular, together with Recipe how to recover cost of Lantern and more in one day. Price \$6 00, boxed ready for shipment. Can be ordered direct from the manufacturer, or through your dealer.

Address **JOHN CARBUTT**, 628 & 630 Chestnut St.,

PHILADELPHIA, PA.

MULLETT BROS.,
Wholesale Dealers
IN
ALL GOODS REQUIRED BY
Photographers, Ferrotypers,
—AND—
ARTISTS IN ALL BRANCHES.

~~~~~  
*RECOLLECT*

That we are the NEAREST to the WESTERN TRADE, and with all the OTHER ADVANTAGES, which those who favor us with their orders know well without our enumerating them.

—*We Request*—

ALL of YOUR TRADE, or as much as you can.

—  
*SEND*

*for our Two Large Complete Illustrated Price  
Lists, and your orders will be  
sure to follow.*

**Mullett Bros. Kansas City, Mo.**

**BÄCKGRÖUNDS · PÄINTED · BÄY**

**W. F.**

**ASHHE**

*ARE FOUND IN MOST OF THE BEST GALLERIES,  
NOT ONLY IN THE STATES BUT ABROAD.*

**NEW BACKGROUNDS AND ACCESSORIES**

OF ALL KINDS ARE BEING CONSTANTLY INTRODUCED.

**W. F. ASHE,** *Scenic Artist,*

106 Bleecker Street, NEW YORK, U. S. A.



ALLEN BROS.

14 & 16 E. LARNED ST.,

DETROIT, MICH.

We keep a full supply of everything pertaining to  
the Art Photographic, with all that  
the term implies.

*Engraved Picture Frames of our manufacture*  
*A SPECIALTY.*

BACKGROUNDS, scenic and plain,  
MATS & SHOW CARDS,  
made to order.

We are the Sole Agents for Michigan and Indiana for L. W.  
Seavey's Backgrounds and Accessories.

HEAD-QUARTERS FOR

APPARATUS,  
DOUBLE GLOSS PAPER,  
COLLODION,  
CHLORIDE GOLD,  
VARNISH.

AIB

All goods first-class. We give personal attention to orders,  
which we solicit from all parts of the country.

*Send for Price-Lists.*

# Benj. French & Co.,

319 WASHINGTON STREET,

## BOSTON.

---

Sole Agents in the United States for the Celebrated

### Voigtlander & Son

### *Portrait Lenses,*

—AND THE—

### WONDERFUL EURYSCOPE.

---

→ The Best Lenses Ever Made. ←

TRY THEM.

## Darlot's PORTRAIT AND VIEW Lenses.

---

*All Genuine Darlots have B. F. & Co.  
engraved on Tube.*

Illustrated Catalogue Sent on Application.

# The Studios of America

Will no doubt soon be published as a companion work to "The Studios of Europe"—when it will be written down that the

**GRANDEST AND MOST PERFECT**

***Photographic Emporium and Studio in the World***

Is located in BALTIMORE, MD.

***No. 205 West Baltimore Street,***

**RICHARD WALZL, *Proprietor,***

---

This new establishment occupies premises costing \$200,000 00 and its outfit cost \$25,000 00. It is a model throughout, and has been especially fitted for the successful manipulation of the now

**WORLD RENOWNED INSTANTANEOUS PROCESS.**

---

**THE STOCK EMPORIUM** is not surpassed by any other on this Continent.

---

*A complete history of its origin and progress—together with a List of all the goods it supplies is set forth in the*

***PHOTOGRAPHERS' FRIEND,***

SEVENTH EDITION.

(Illustrated with Steel Plate Portrait of the Proprietor.)

***JUST OUT.—GRATIS.***

---

OUR LITERARY WORKS are known the World over as the MOST PRACTICAL, CHEAPEST and BEST.

---

**The Photographic Rays of Light,**

The Most Popular Periodical of the times, is issued from this establishment.

**Twenty-two years successful conduct.**

***Photography our fort (e) which we defend.***

Jno. G. Hood.

Established 1865.

Wm. D. H. Wilson.

# WILSON, HOOD & CO.

DEALERS IN

# PHOTO. GOODS.

SOLE AGENTS FOR

## ROSS AND STEINHEIL LENSES.

---

Orders solicited for any of the following makes of lenses.

*Voigtlander,*

*Dallmeyer,*

*Peerless,*

*Morrison,*

*Zentmeyer,*

*Darlot,*

*Waterbury,*

*Platyscope,*

*E. A. & G. C.*

---

CAMERA BOXES MANUFACTURED BY  
Am. Op. Co., Anthony, S. Peck & Co. and Semmendinger.

---

CHAIRS MANUFACTURED BY  
Knell, Schindler, Bowdish & Scovill.

---

HEAD RESTS.  
Wilson, and Spencer.

---

ALBUMEN PAPERS.  
N. P. A., S. & M., Morgan's, Hovey's, etc.

---

DRY PLATES.  
Carbutt's, Eastman's, and Cramer & Norden's.

---

DRY PLATE OUTFITS OF ALL KINDS, ALWAYS IN STOCK.  
COLLINS' CARD STOCK.

We keep the largest and most complete stock in this city. Trial and Outfit Orders solicited. Complete Price-lists and estimates furnished.

825 Arch St. Wilson, Hood & Co., PHILADELPHIA



W. J. HAZENSTAB,  
*Photographic Stock House,*

Formerly 406 Market,

Is now Installed in New and Larger Quarters, at

918 OLIVE STREET,

*Where we will be able to double the orders formerly  
received from our friends, patrons and strangers.*

All those visiting ST. LOUIS will do well to CALL at ABOVE NUMBER.

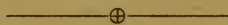
WE COULD NAME THIS THE

PHOTOGRAPHERS' BLOCK,

—*AS* THERE ARE —

*Mr. A. J. Fox at 916, and Mr. J. A. Scholten at 920 ; then we have  
Messrs. Hurlbut & Thorndorff, Mr. D. C. Redington, Mr.  
D. B. Taylor, and lately, Mrs. J. H. Fitzgibbon,*

All Opposite our Store.



✻ THANKS FOR PAST FAVORS ✻

And hoping to be favored with all orders, both large and small, with  
prompt attention to all that is intrusted to our care, we are, as ever,

*Your Most Obedient,*

W. J. HAZENSTAB,

9 8 Olive St.,

ST. LOUIS.

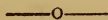
# Morgan's Albumenized Paper.



The Best Albumen Paper in  
the Market.



The most uniform in its working qualities.



Tones more easily, with less gold, and keeps white after silvering in hot weather longer than any paper offered for sale.

*Send for sample dozen.*

THOS. H. MCCOLLIN,

Trade Agent.

631 ARCH ST., PHILADELPHIA.

# The Mound City

Central Photographic Stock House

—AND—

## Art Emporium,

No. 411 North 4th St., ST. LOUIS, MO.

---

*The Leading House of the West.*

*Photographic Merchandise of Every Description.*

Novelties in our Accessory Department Continually Arriving.

Prices are exceptionally low, and our goods always fresh and reliable.

We shall be pleased to serve you. Send for our new illustrated Catalogue, the largest and most complete Photographic List ever published.

---

### DRY PLATE MATERIAL

of known reliability always on hand. The "Mound City" Brand being ESPECIALLY recommended for real merit. Ask your dealer for them and take no other.

Correspondence on subjects relating to Photography solicited and all questions cheerfully answered.

Yours to command,

**H. A. HYATT,**

411 N. 4th Street,

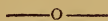
ST. LOUIS, MO.

# Chas. Cooper & Co.,

Manufacturing Chemists & Importers,

194 Worth St., NEW YORK,

*near Chatham Square.*



## PHOTO. CHEMICALS,

*Guaranteed Strictly Pure.*



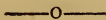
**CROSS SWORD DRESDEN**

**ALBUMEN PAPER,**

**SAXE EVAPORATING DISHES,**

**SOLID GLASS BATHS,**

**USENER'S PORTRAIT LENSES.**



Refining of Photographic Wastes and Residues  
a Specialty.



WORKS AT NEWARK, N. J.



1878. EAGLE STOCK HOUSE. 1882.

No. 250 MERCER ST.,

*Bet. 3rd & 4th Sts.,*

*One block west of B'way.*

---

*Having now Removed to the above location,  
and Stock fully arranged, I am prepared to fill  
all orders promptly and at bottom prices.*

**A full Line of Every Kind of Photo-  
graphic Goods,**

WET AND DRY.

---

*Outfits a Specialty.*

---

George Murphy,

250 Mercer St.,

NEW - - YORK.

THE OLD RELIABLE !

---

P. SMITH & CO.,

141 & 143 WEST FIFTH STREET,

CINCINNATI, OHIO.

AND

BRANCH AT

NO. 6 EAST BROAD STREET,

COLUMBUS, OHIO.

---

WHERE

The Amateur and the  
Professional Photographer

WILL FIND EVERYTHING

Requisite for either the WET or the DRY PLATE  
PROCESS.

---

*Dry Plates and Outfits in Great Variety.*

---

*Velvet Frames, etc., etc., etc.,*

TEXAS HEAD-QUARTERS

FOR

PHOTOGRAPHIC SUPPLIES.

Blessing & Bro.,  
Galveston, Texas.

---

Keep in stock, and constantly receiving,

Photographic Goods of all kinds,

—INCLUDING—

LENSES, BOXES, and  
APPARATUS of every description,  
PURE CHEMICALS,  
FRESH PAPERS,  
CARD STOCK,  
DRY PLATE OUTFITS  
AND REQUISITES.  
FERROTYPE MATERIAL,  
FRAMES, MATS, ALBUMS,  
STEREOSCOPES AND VIEWS, ETC., ETC.

All at the Lowest Prices.

---

*Send for Catalogue and Price-Lists.*

# WILSON'S PHOTOGRAPHIC PUBLICATIONS.

**The Philadelphia Photographer.**—A monthly magazine, illustrated by photographs of superior merit. \$5 00 a year; \$2 50 for six months. Stands ahead of all its kindred. Seventeen years of success is a sufficient guarantee of its value and use to the practical, working, growing photographer. Do not go without its valuable help. Send for circular and sample copy.

**The Practical Printer.**—By C. W. HEARN. Price, \$2 50. Second edition now ready. This is a most handy and reliable book. It goes into all the operations of plain and fancy silver printing, and is *full* of good.

**Photographers' Pocket Reference Book.**—By Dr. H. VOGEL. Price, \$1 50. For the dark room. It meets a want filled by no other book. Full of formula—short, practical, and plain.

**The Ferrotypes' Guide.**—Price, 75 cents. Cheap and complete. For the Ferrotyper this is the only standard work. Seventh thousand.

**Pictorial Effect in Photography.**—By H. P. ROBINSON. For the Art Photographer. Cloth, \$1 50. Paper cover, \$1 00.

**Wilson's Lantern Journeys.**—By EDWARD L. WILSON. In two volumes. Price, \$2 00 per volume. For the lantern exhibitor. Gives incidents and facts in entertaining style of about 2,000 places and things, including 300 of the Centennial and Paris Exhibitions.

**Bigelow's Artistic Photography.**—Price reduced to \$4 00. For the lover of art. Beats his "Album of Lighting and Posing." Superb! With twelve photographs and instructions.

**Burnet's Hints on Composition.**—Price \$3 50. All should study it. A splendid work; largely illustrated, giving all the rules and principles of artistic posing.

**Studies in Artistic Printing.**—By C. W. HEARN. Price \$3 50. Embellished with six fine cabinet and promenade portrait studies.

**The Photographic Colorists' Guide.**—By JOHN L. GIBON. Cloth bound, \$1 50. The newest and best work on painting photographs.

**Photographic Mosaics.**—144 pages practical matter. Price 50 cents.

---

## WILSON'S PHOTOGRAPHICS.

Just Published, A NEW PHOTOGRAPHIC LESSON-BOOK, by E. L. Wilson.

The author believes it to be the best effort he has ever made, and begs to call attention to its peculiar advantages as a

### *Standard Book for all Workers in Photography.*

Lesson A. Treatment of the Subject—B. The Needful Apparatus—C. The Objective or Lens—D. The Dark Room—E. Preparation of the Glass—F. Chemicals and Solutions—G. The Manipulations—H. Manipulatory Miseries—I. Retouching the Negative—J. The Glass Studio—K. Accessories and Light—L. Managing the Model—M. Printing on Albumen Paper—N. Printing on Plain Paper—O. General Remarks on Printing—P. Printing on Various Surfaces—Q. Printing Perplexities—R. Art in Printing—S. Mounting and Finishing—T. Photography Outside—U. Bromo-Gelatine Emulsion Work—V. Vogel's Collodion Emulsion—W. Enlargements and Lantern Slides—X. Phototypes, Platinotypes, and Collodion Transfers—Y. Wastes and Their Worth—Z. Metrical Measuring, etc.—Concluding Confab—Index (six pages.)

The index added is very full, and will enable the reader to quickly find almost any subject needed on every practical department of the art.

It is believed that this is the most valuable work ever offered to the working photographer. It contains 352 pages. More than 100 illustrations.

### *Processes, Old and New, Public and Secret.*

Among the latter are the "Phototype," sometimes called the "Artotype" process, with examples; many of the "Lightning" processes; the "Platinotype" process; the "Collodion Transfer" or "Megatype" process, and many others.

**\$4 00. POST-PAID. \$4 00.**

For the beginner, for the amateur, for the photographic worker, it is believed to be most complete. No live photographer should fail to get it soon, before his neighbor is ahead. For other points see advertisements. An index of the work sent free.

Edward L. Wilson, Author and Publisher, 912 & 914 Chestnut St., Phila., Pa.



**WOLF & CHEYNEY,**

*821 FILBERT ST.,*

**PHILADELPHIA.**

---

Supply House for all  
the requirements of  
the Practical and Am-  
ateur Photographer.

---

**PHILADELPHIA, PA.**

**821 FILBERT STREET,**

**WOLF & CHEYNEY,**

# DOUGLASS

GAYTON A. DOUGLASS.

HENRY G. THOMPSON.

229 AND 231 STATE STREET  
CHICAGO

Merchants in all Requisites pertaining to the  
Art-Science of Photography.

# THOMPSON

CATALOGUES FREE.

Photographers' Monthly Bureau of Information.

Hints on Furnishing Photographs.

FREE.

# & CO.

PHOTOGRAPHERS'

Booksellers, Stationers and Newsdealers.



ESTABLISHED IN 1802.

---

# Savill Manufacturing Co.,

MANUFACTURERS & DEALERS IN ALL

Articles  
PERTAINING  
TO  
Photography.

---

FACTORIES: Waterbury, Conn., New Haven, Conn., New York City.

W. IRVING ADAMS, Agent.

---

419 & 421 Broome Street, NEW YORK.



# JAMES W. GILLIS.

Manufacturer of

Picture Frames,  
Mouldings, etc.



FINE GOLD WORK A SPECIALTY.

ROCHESTER,  
N. Y.

# JAMES W. GILLIS.

---

A large and elegant line of

## Portrait Frames

in Gold, Bronze, Rare Woods, etc., in great variety of ornamentation, styles and finish.

Having competent designers, and facilities second to none in the country, we are enabled to constantly offer additional novelties for Artistic Framing.

## Mouldings

In Gold, Bronze, Berlin Gilt and Gold, Ebony, Oak and Gold, Mahogany, etc.

Ornamented Mouldings and Frames in the white.

---

Rochester, N. Y.

N. C. THAYER & CO.,

—WHOLESALE—

PHOTOGRAPHIC MATERIALS,

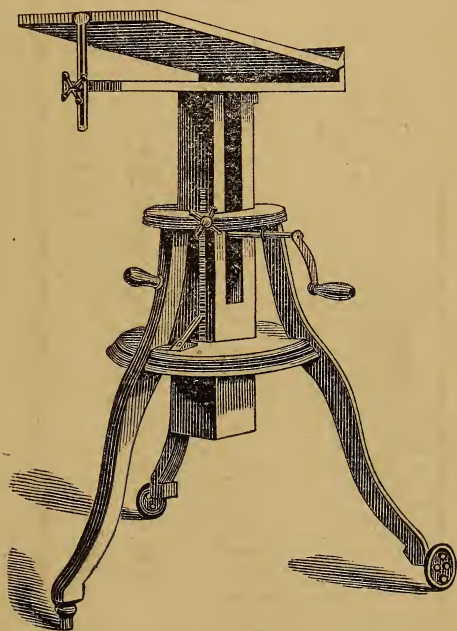
46, 48 & 50 Jackson St.,

CHICAGO.

# THE NEW AND IMPROVED HANDY CAMERA STAND.

Made of black walnut, on the SIMPLEST COMMON SENSE PRINCIPLES, and more PERFECTLY POLISHED than any other stand in the market.

The Simplest.



The latest Style.

The Easiest to Manage.

The Strongest.

*The raising and lowering of the top is accomplished in one-fourth the time required by most other stands, and with GREATER EASE. All grating of iron cogs dispensed with. I guarantee it to give the most perfect satisfaction.*

Try it for 4-4 or 8 x 10 Box, and if not pleased with it *ship it back at my expense.*

**PRICE, - - - - \$15 00.**

MANUFACTURED BY

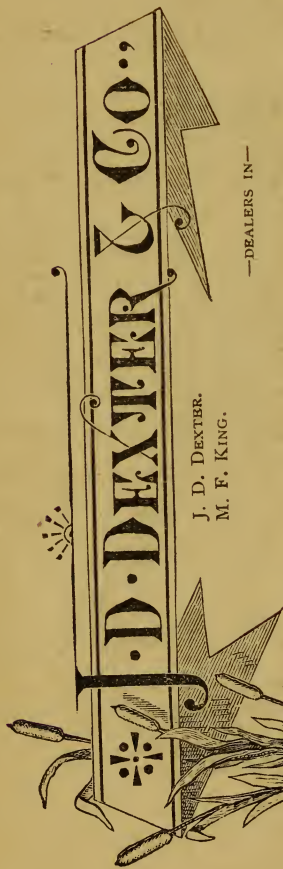
**JAMES H. SMITH,**

*Wholesale Photo. Goods, Frames, Albums, etc.*

NO. 20 NORTH 4TH S

QUINCY, ILL.





J. D. DEXTER,  
M. F. KING.

—DEALERS IN—

## Photographic Materials,

Picture Frames, Mouldings, Fine Glass, &c.

AMATEUR OUTFITS.

NO. 480 CONGRESS ST., - PORTLAND, ME.



# J. A. Anderson,

MANUFACTURER OF

## *Photographic Apparatus*

*And Dealer in Supplies.*

63 & 65 East Indiana St.,

CHICAGO,

ILL.



The ONLY Manufacturer who furnishes the Celebrated "Bonanza Plate Holders" with his First Quality Camera Boxes without extra charge.

I have testimonials from the following leading Artists, who recommend the "Bonanza" as being Superior to all others :

SARONY, New York.

A. BOGARDUS, "

J. J. MONTGOMERY, Mora's Gallery, New York.

J. LANDY, Cincinnati, Ohio.

LEON VAN LOO, " "

F. WYBRANT, Louisville, Ky.

H. ROCHER, Chicago, Ill.

W. H. RULOFSON, San Francisco, Cal.

G. D. MORSE, " "

D. B. TAYLOR, " "

SILAS SELLECK, " "

BUFFALO

PHOTOGRAPHIC WAREHOUSE.

*David Tucker & Co.*

Photographers'  
Supplies.

---

410 MAIN ST.

**BUFFALO, N. Y.**

DAVID TUCK

S. B. BUTTS

STEAM AND ELECTRICITY.

**Photographic Enlargements**

BY THE

ELECTRIC LIGHT.

**I. PAXSON,**

65 E. Ninth St.,



NEW YORK.

*The First, Best and Last to Use the Electric Light for Enlargements in America.*

2d Door W. of Broadway.

Send for Price List.



   
GEO. R. ANGELL,  
DEALER IN

Photographic Stock,

PICTURE FRAMES,

MOULDINGS, CHROMOS,

—  AND  —

*ARTISTS' MATERIALS.*

GEO. R. ANGELL,

158 Woodward Ave.,

DETROIT, MICH.



EASTMAN'S

*Gelatino-Bromide*

# DRY PLATES.

---

RELIABLE, RAPID,  
INSTANTANEOUS.

ALSO THE

## **Tropical Dry Plates,**

Can be Used in any Climate and be Developed  
and Washed with Hot Water!

---

*Eastman's Gelatino-Bromide Pellicle,*

For those who wish to prepare their own Plates.

Manufactured only by the

*EASTMAN DRY PLATE CO., Rochester, N. Y.*

---

**E. & H. T. Anthony & Co., 591 Broadway, New York.**

SEND FOR CIRCULAR.

TRADE AGENTS.

# ANTHONY'S DRY PLATE OUTFITS

*Most Complete Assortment in Market*

*Instruction Book free with  
each Outfit.*



*Outfits, \$10 and upwards.*

*Send for Illustrated Price-List.*

*The Lenses supplied with these are superior to those furnished by  
Any other House. Send for Descriptive Circular.*

**Anthony's Patent Perfect Dry Plate-holder,  
BEST IN THE WORLD!**

**E. & H. T. ANTHONY & CO. 591 B'way, NEW YORK.**

LIGHT, PORTABLE AND INEXPENSIVE,

FIRM, SUBSTANTIAL AND PRACTICAL.

# J. C. SOMERVILLE, ST. LOUIS.

---

*We give SPECIAL PRICES*  
ON  
COMPLETE OUTFITS.

THE  
Am. Opt. Co. Apparatus. Dry Plate Outfits  
from \$10 00 to \$41 50.

---

BEEBE AND GRAMER & NORDEN

DRY PLATES.

*5 per cent. Discount on orders of \$10 00.*

---

A FULL LINE OF STAPLES.

—Send for Bargain List and Circulars.—

1009 OLIVE STREET.



H. Lieber.

ESTABLISHED 1854.

Chas. Koehne.

# H. Lieber & Co's Art Emporium.

---

HEADQUARTERS FOR

Photographers' Materials and Apparatus.

---

*All the Leading Brands of Dry Plates  
Kept in Stock.*

---

**AMATEUR DRY PLATE OUTFITS,**

**ALSO,**

**ARTISTS' AND WAX MATERIALS,  
PICTURE FRAMES, MOULDINGS,  
LOOKING GLASSES, ETC.**

---

*Send for Catalogues.*

**82 E. Washington St.,  
Indianapolis, Ind.**

# The BEST is the CHEAPEST.

---

*Dallmeyer Lenses,  
Success Cameras,  
Climax Cameras,  
E. A., G. C. and Platyscope Lenses,  
Handy Head-Rests.*

---

*Genuine N. P. A. & S. & M. Albumen Papers,  
With The WATER-MARK.*

*Brilliant Swiss Albumen Papers,  
A. D. Swiss Albumen Papers,  
Hovey's, Morgan's, Peerless, Clemons' & Hail  
Columbia Albumen Papers.*

*In future we shall be prepared to furnish the N. P. A. Extra Bril.  
Albumen Paper in White, Pink, Pearl and Pensé Tints.*

---

## **Chemicals of Guaranteed Purity and Strength.**

*Every Requisite for the Studio and Field.*

SEND FOR ILLUSTRATED CATALOGUE AND PRICE-LIST.

---

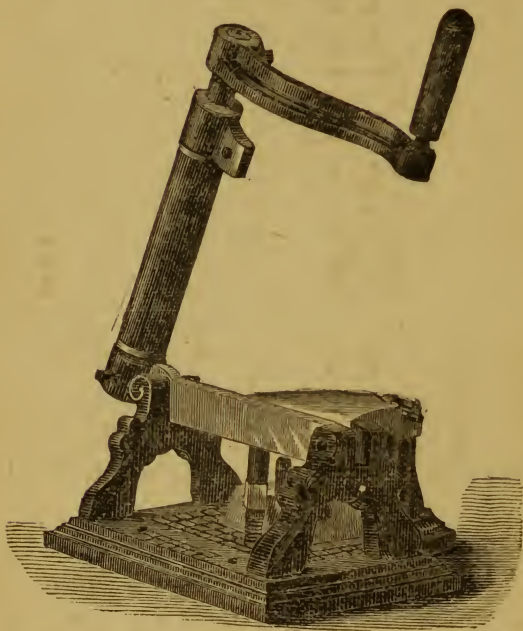
The most Extensive Line of Velvet, Plush and Ebony Frames, Easels, Albums, Stereoscopes, Graphoscopes, Portraits of Celebrities, Stereo. Views, etc., on this Continent.

---

**E. & H. T. ANTHONY & CO.,**

**591 BROADWAY, NEW YORK CITY. 591**

# BASS' PATENT CLIMAX BURNISHER.



**Every known improvement has been added to this machine. Photographers will find that it is the only style of machine that will do the largest work without the loss of a single print.**

Reciprocating roll, removable plate, removable roll, every piece made in exact duplicate. The roll can be taken out for draw filing, or it can be by a simple device raised to a perpendicular position. A new roll, plate or any part of the machine can be had at a merely nominal cost, and no trouble as to fitting, as every piece is made the same.

Manufactured in the following sizes—6 inch, 9 inch, 10 inch, 14 inch, 18 inch, 24 inch, 30 inch. **PRICES REDUCED.**

For Sale by all of the leading Photo. Stock Dealers in this country and in Europe.

**SOLE PATENTEE AND MANUFACTURER,**

**J. P. BASS, BANGOR, MAINE.**

ZIMMERMAN BROS.,

DEALERS IN

# Photographic Supplies,

Artists' Materials, Frames, Albums, Views and

PHOTOGRAPHIC SPECIALTIES.

*No. 9 West Third Street,*

E. O. ZIMMERMAN.  
C. A. ZIMMERMAN.

ST. PAUL, MINN.



Established, 1874.

# CENTRAL STOCK HOUSE.

—◆◆◆◆◆—  
Headquarters for

**MORAN'S** Specialties.  
**MORAN'S** Collodions, Negative and Positive.  
**MORAN'S** Celebrated Challenge Varnish.  
**MORAN'S** Nitrate of Silver, C. P.  
**MORAN'S** Chloride of Gold, C. P.

—◆◆◆◆◆—  
PUBLISHER OF  
MORAN'S MONTHLY BARGAIN LIST.

—◆◆◆◆◆—  
DRY PLATE Outfits a SPECIALTY. —◆◆◆◆◆—  
—◆◆◆◆◆—

*Lenses, Camera Boxes, Accessories, etc., etc.,  
Bought or Exchanged.*

—◆◆◆◆◆—  
SEND YOUR ADDRESS FOR THE  
*Illustrated Catalogue of Prices, Free to All.*

—◆◆◆◆◆—  
A TRIAL ORDER SOLICITED.

—◆◆◆◆◆—  
R. H. MORAN,

231 CENTER STREET,

**NEW YORK CITY.**

N. W. Cor. Grand St.,

E. Weiskopf,  
Manufacturer of  
Optical Lenses,  
Condensers,  
and Magnifying  
Specialties: Cosmorama Lenses,  
Mirrors,  
New York.

N. H. H. Depot, Franklin St. }  
4 doors West of Center.

CRAMER & NORDEN'S

—ST. LOUIS—

# Extra Rapid Dry Plates.

For Sale by all Dealers,  
AND USED BY ALL LEADING PHOTOGRAPHERS.

E. & H. T. Anthony & Co.,

591 BROADWAY, NEW YORK.

---

SOLE IMPORTERS OF THE

*Premium Dallmeyer Lenses, and Celebrated 'N. P. A. Dresden' Albumen Paper.*

---

MANUFACTURERS OF THE

*Unrivalled Success Camera Boxes and Apparatus, Albums, Velvet Frames, Stereoscopes, Lanterns, etc., etc., etc.*

---

AND OF

*Anthony's Far-famed Photographic Chemicals and other preparations.*

---

AGENTS FOR THE TRADE OF

*The Adamantean Ferro. Plates and the Entrekin and Weston Burnishers.*

---

DEALERS IN

EVERYTHING PERTAINING TO PHOTOGRAPHY.



AMERICAN ALBUMEN PAPER CO.

MANUFACTURERS OF

Hovey's & Peerless  
BRANDS

—OF—

❧ PAPER. ❧

The BEST ALBUMEN PAPER of the Day.

IN DOUBLE AND SINGLE.

WHITE,  
PINK, or  
PEARL.

BLUE,  
and  
DEEP PINK.

*The above Brands of Paper are SEPARATE and DISTINCT in their  
Formulas, and will be kept up to their FORMER STANDARD.*

*The Best in the Market!*

ASK YOUR DEALER FOR IT.

D. HOVEY, President.  
A. M. BROWN, Sec. & Manager.

**ROCHESTER, N. Y.**













GETTY RESEARCH INSTITUTE



3 3125 01063 6617

